



Achaemenid Settlement in the Persepolis Plain

W. M. Sumner

American Journal of Archaeology, Vol. 90, No. 1. (Jan., 1986), pp. 3-31.

Stable URL:

<http://links.jstor.org/sici?sici=0002-9114%28198601%2990%3A1%3C3%3AASITPP%3E2.0.CO%3B2-8>

American Journal of Archaeology is currently published by Archaeological Institute of America.

Your use of the JSTOR archive indicates your acceptance of JSTOR's Terms and Conditions of Use, available at <http://www.jstor.org/about/terms.html>. JSTOR's Terms and Conditions of Use provides, in part, that unless you have obtained prior permission, you may not download an entire issue of a journal or multiple copies of articles, and you may use content in the JSTOR archive only for your personal, non-commercial use.

Please contact the publisher regarding any further use of this work. Publisher contact information may be obtained at <http://www.jstor.org/journals/aia.html>.

Each copy of any part of a JSTOR transmission must contain the same copyright notice that appears on the screen or printed page of such transmission.

The JSTOR Archive is a trusted digital repository providing for long-term preservation and access to leading academic journals and scholarly literature from around the world. The Archive is supported by libraries, scholarly societies, publishers, and foundations. It is an initiative of JSTOR, a not-for-profit organization with a mission to help the scholarly community take advantage of advances in technology. For more information regarding JSTOR, please contact support@jstor.org.

Achaemenid Settlement in the Persepolis Plain*

W.M. SUMNER

Abstract

The purpose of this paper is to interpret settlement geography in the Persepolis region using archaeological and historical sources. Ceramic and other dating criteria are discussed and it is argued that the settlement system existed from a date soon after the end of Cyrus' reign until Alexander's conquest. Archaeological sites described include 39 habitation sites, irrigation works, and a paved road. The settlement system is reconstructed by estimating the number of sites not yet recorded and it is argued that the sedentary population did not exceed 44,000. Descriptions by Classical authors are summarized and geographical implications of the Persepolis Fortification texts are explored, expanding a line of analysis initiated by Richard Hallock. Analysis reveals a five-level settlement hierarchy, arranged in districts around Persepolis, that accords well with the archaeological record. Arguments are advanced for the location of several named places, particularly Matezziš, which is identified with sites in the plain adjacent to Persepolis. Land use patterns and economic organization in the valley are tentatively reconstructed, with the implication that some districts emphasize field crop production and others pastoral production.

Parsargadae, Persepolis, and the royal tombs at Naqsh-e Rostam have dominated Achaemenid studies in Fars Province for more than a century. While it

is true that isolated buildings, habitation mounds, dams, quarries, and various small monuments have been reported, few of them have been subjected to detailed study and no attempt has been made to reconstruct the Achaemenid settlement system in the Persepolis plain from archaeological data. Thus our knowledge of Achaemenid settlement in the region is founded on Classical sources and geographic analysis of the Persepolis texts by Hallock.¹ The purpose of this paper is to present an interpretation of settlement geography in the Persepolis region, drawing on both archaeological and historical sources.

CHRONOLOGY

The habitation mounds discussed here are assigned to the Achaemenid period on the basis of ceramics from surface collections. The ceramic assemblage used as a standard during survey was collected from an excavation dump located near the Frata-dara Temple excavated by Herzfeld.² The ceramic types in this assemblage find close parallels in the published ceramics from Persepolis and Pasargadae. Schmidt designates the Persepolis pottery as late Achaemenid and Stronach states that the Pasargadae pottery, mostly from Tall-i Takht, "... is to be ascribed in the main

* I am grateful to Matthew Stolper for answers to many questions on the Persepolis Fortification texts, for giving me access to unpublished transcriptions of texts prepared by Richard Hallock, and for comments on a draft of this paper. I also wish to thank Jack Martin Balcer for comments on the draft, for guiding me through the Bisutun inscriptions, for many stimulating discussions of Greek and Achaemenid history, and for translations of several sources. I also wish to thank Carol Kramer for useful comments on the draft, Kathleen MacLean for encouragement and valuable editorial commentary, and David Stronach, the AJA reviewer, for valuable substantive and bibliographic comments. If errors of fact or interpretation remain they are my responsibility.

Finally, I must express my appreciation for the patience and skill of Michele Morock and Jeanne Von Ville who prepared the manuscript. Cynthia Smith prepared a computer coding of the Persepolis texts and Alan Hirtle prepared ills. 4, 5, 6, and 7.

Much of the field data presented here was collected during research for my doctoral dissertation, *Cultural Development in the Kur River Basin, Iran: An Archaeological Analysis of Settlement Patterns* (University of Pennsylvania 1972), completed under the supervision of Robert H. Dyson, Jr., who initiated me into Near Eastern archaeology and has been a source of material support and intellectual inspiration for my research ever since. Much of the archaeological data presented from my survey is previously unpublished and is indicated in the citations by the abbreviation WMS. In addition, the following abbreviations are used:

Bergner Karl Bergner, "Bericht über unbekannte

achaemenidische Ruinen in der Ebene von Persepolis," *AMIran* 8 (1937) 1-4.

Hallock (1969) R.T. Hallock, *Persepolis Fortification Tablets* (OIP 92, Chicago 1969).

Hallock (1971) R.T. Hallock, *The Evidence of the Persepolis Tablets* (a separately printed chapter of *The Cambridge History of Iran II* [Cambridge 1971]).

Hallock (1977) R.T. Hallock, "The Use of Seals on the Persepolis Fortification Tablets," in McG. Gibson and R.D. Biggs edd., *Seals and Sealings in the Ancient Near East* (Bibliotheca Mesopotamica 6, Malibu 1977) 127-33.

Hallock (1978) R.T. Hallock, "Selected Fortification Tablets," *Cahiers de la D.A.F.I.* 8 (1978) 109-36.

Nichol M.B. Nichol, "Rescue Excavations near Dorudzan," *East and West* N.S. 20 (1970) 245-84.

Tilia A.B. Tilia, "A Survey of Achaemenian Sites in the Northeastern Part of the Marvdasht Plain," in *Studies and Restorations at Persepolis and Other Sites of Fars II* (IsMEO Reports and Memoirs 17, Rome 1978) 73-91.

¹ Hallock (1971), (1977), and (1978).

² E.F. Schmidt, *Persepolis I* (OIP 68, Chicago 1953) 55-56, fig. 17.

to the fourth and third centuries B.C. . . .³ Indeed, no excavated corpus of Achaemenid pottery in Fars can be assigned a date earlier than the late fifth century B.C. Very few sherds found in surface collections are without parallels in the assemblages from Persepolis and Pasargadae. The Djalabad culture proposed by Vanden Berghe must be identical to the material published here (ills. 1 and 2) collected from the same group of mounds west of Persepolis.⁴

These observations raise a difficult question concerning archaeological evidence for the early Achaemenid period in Fars. The historical evidence, reviewed by Stronach,⁵ indicates that the house of Achaemenes ruled in Anshan at least as early as the mid-seventh century B.C. and possibly as much as a century earlier. The last Elamite King to claim suzerainty over Anshan was Adda-hamiti-Inšušinak (ca. 650 B.C.) and it is unlikely that the claim was relinquished immediately upon the arrival of the Achaemenid nomads.⁶ Thus we are left with a four- or five-century archaeological hiatus between the end of the Teimuran culture, which may last until 800 B.C. but more probably terminates at about 900 B.C.,⁷ and the earliest date assigned to known Achaemenid ceramics.

Fortunately, however, ceramics are not the only basis for dating Achaemenid sites in the Persepolis plain. Isolated remains of stone architecture have been known in the region for some years and additional important sites have recently been discovered as a result of intensified agricultural activity west of Persepolis. Stylistic and technical analysis of these stone features provides our earliest dates for Achaemenid building activity on the plain. The architectural style and stone cutting techniques of several of these buildings, most notably the palace at Dasht-e Gohar (ill. 3, T) imply a construction date of no later than 520 B.C. and quite possibly a date anteceding the construction of Pasargadae.⁸ Unfortunately, the ceramic assemblage associated with these buildings has not been published. Under the circumstances it is reasonable to assume that the ceramic types known from excavation and survey must have been in use as early as the last

decades of the sixth century. Aside from the fact that both Schmidt and Stronach ascribe these types to the fourth century or later, the problem of incomplete discovery during survey is the most obvious objection to extending the chronological range of known types.

Thus, it might be suggested that early Achaemenid mounded sites exist and have not been discovered or that such sites have been discovered but the Achaemenid ceramic components have not been recognized. Neither of these explanations can be rejected with assurance, but both appear to be very unlikely. The present inventory of mounded archaeological sites in the Kur River Basin, encompassing all of the districts in the plain around Persepolis, includes over 1000 sites. An analysis of site discovery ratios, based on aerial photography and several independent intensive surveys, suggests that at least 30% and possibly as many as 50% of the mounded sites have been recorded. It is known that small single-component sites, typical of the Achaemenid period, are underrepresented in the site inventory. However, there is no evidence from intensive surveys that this bias is exaggerated for early, as opposed to later, Achaemenid sites. It is also known that early components of larger multi-component sites are less likely to be discovered than later components. This bias is not serious for Achaemenid sites, relatively late in the chronological sequence, and there is no reason to believe it would effect earlier Achaemenid components more than later ones. Finally, there is no significant set of unidentified ceramic types from survey that could represent an early Achaemenid assemblage.⁹

Even if the proposed chronological extension of known Achaemenid ceramic types back into the late sixth century B.C. is accepted, we must still explain the absence of a ceramic assemblage to be ascribed to the earlier centuries of Achaemenid presence in Fars. It is unreasonable to suppose that the Achaemenid tribes, newly arrived on the northern and eastern marches of Fars at about 700 B.C. or earlier, would have long ignored the rich pastures of the Persepolis plain, virtually uninhabited since 900 B.C. However,

³ D. Stronach, *Pasargadae* (Oxford 1978) 183–84; E.F. Schmidt, *The Treasury of Persepolis and Other Discoveries in the Homeland of the Achaemenians* (OIC 21, Chicago 1939) 85. Schmidt, *Persepolis II* (OIP 69, Chicago 1957) 96.

⁴ L. Vanden Berghe, *Archéologie de l'Iran ancien* (Leiden 1959) 44–45.

⁵ Stronach (supra n. 3) 280–95.

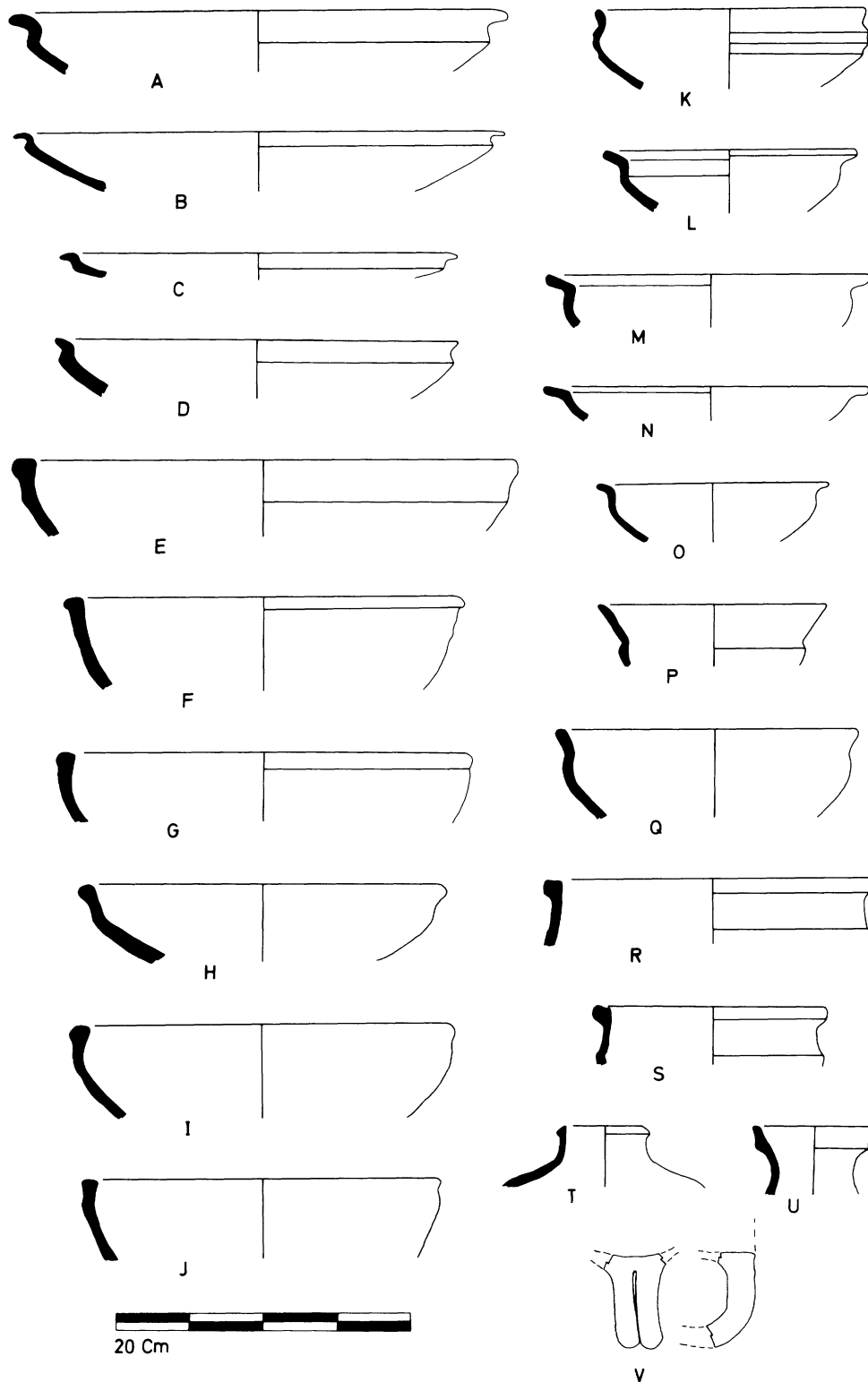
⁶ F.W. König, *Die elamischen Königsinschriften* (Afo Suppl. 16, 1965) EKI 86; P. de Miroschedji, "La fin du royaume d'Anshan et de Suse et la naissance de l'empire perse," *ZAssyri* (forthcoming).

⁷ The only excavated Teimuran site is Darvazeh Tepe. Five dates from the latest phase cluster between 780 and 910 B.C. (MASCA corrected) and a sixth date, 500–640 B.C. is a MASCA crossover date. For the date list see L.K. Jacobs, *Darvazeh Tepe*

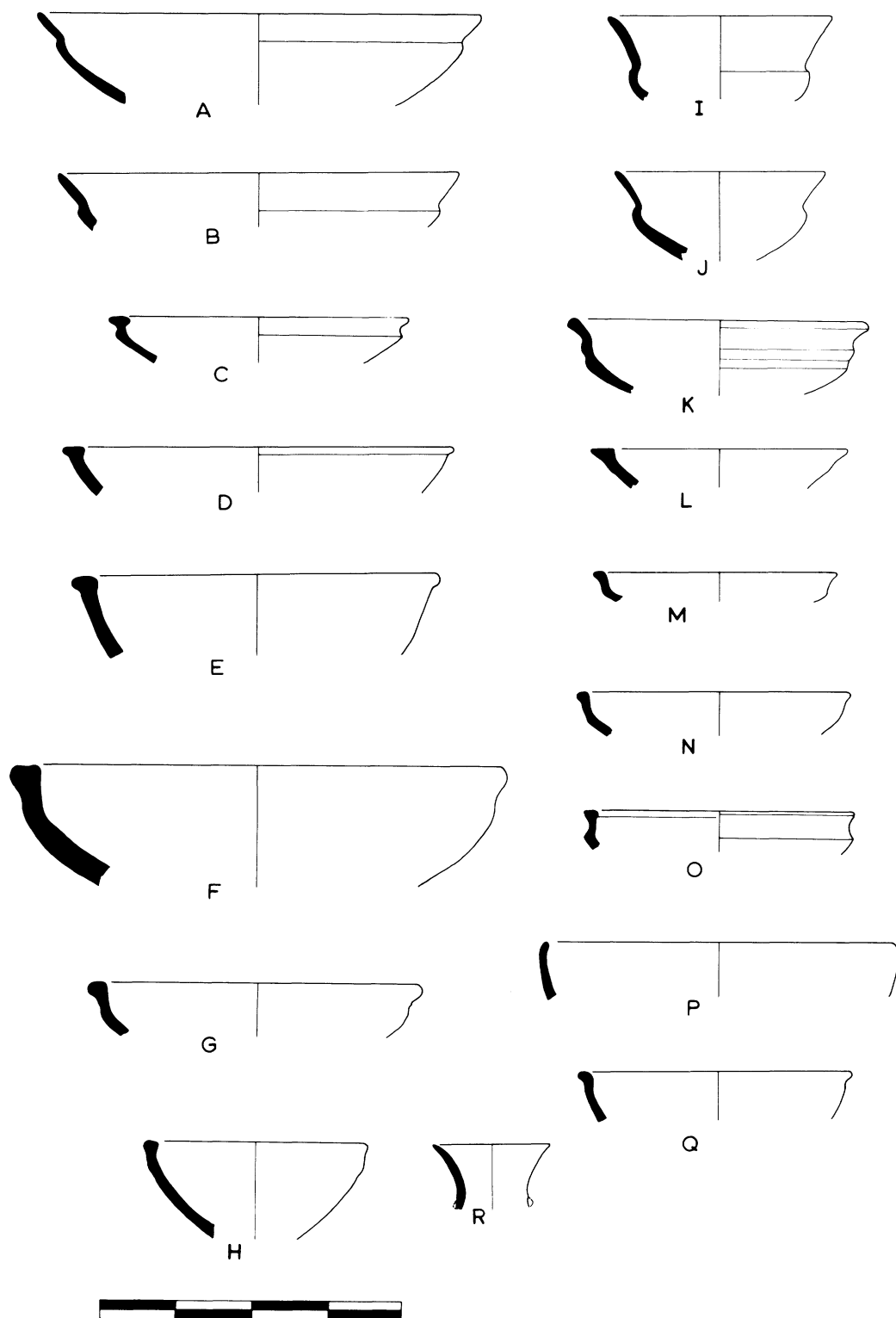
and the Iranian Highlands in the Second Millennium B.C. (Diss. University of Oregon 1980) 48–52. For MASCA corrections see E.K. Ralph *et al.*, "Radiocarbon Dates and Reality," *MASCA Newsletter* 9 (1973) 1–20.

⁸ The column tori at Dasht-e Gohar, described as "... swelling, cushion-shaped base tori placed on square roughly worked foundation slabs ..." (Tilia 89, 90) are dated to the period between the construction of Pasargadae and Persepolis, 530–520 B.C., on the basis of both technical and stylistic analysis (Tilia 80).

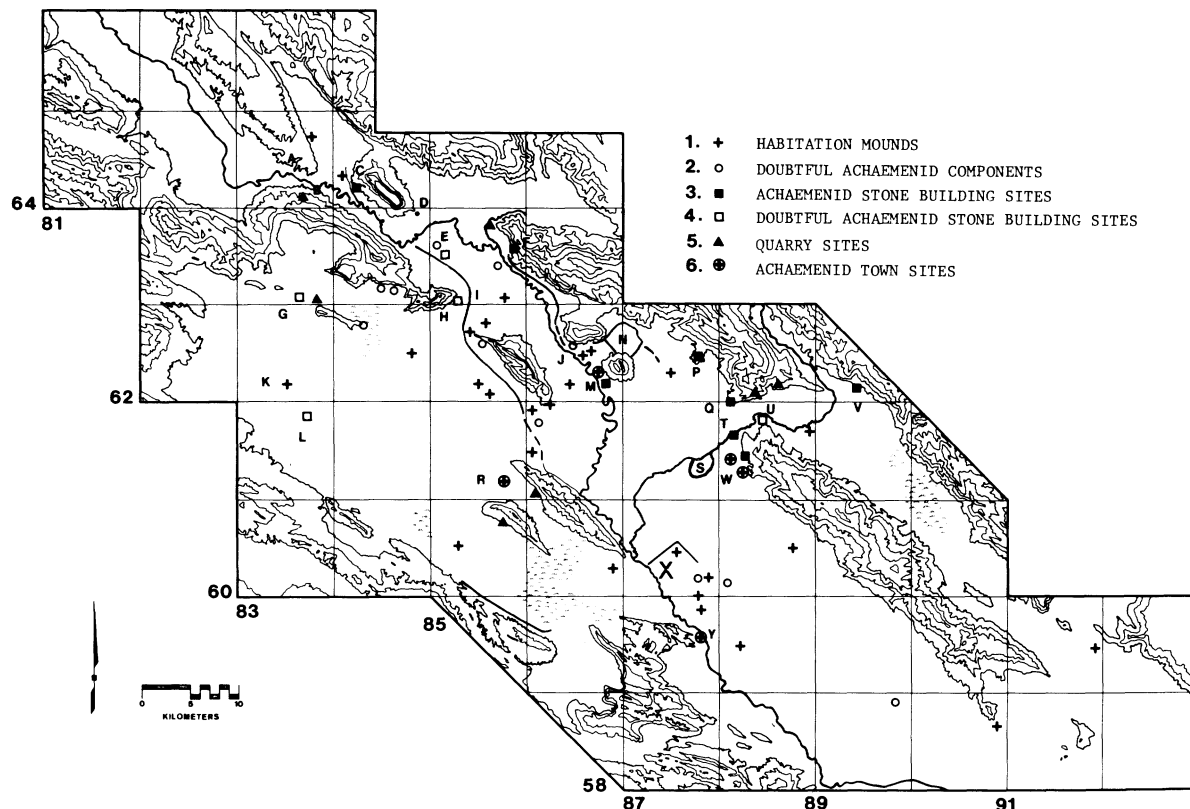
⁹ The survey evaluation is taken from work currently in progress on an archaeological gazetteer of the Kur River Basin. This research has relied extensively on J.R. Alden, *Regional Economic Organization in Banesh Iran* (Diss. University of Michigan 1979) and Jacobs (supra n. 7).



Ill. 1. Achaemenid ceramic forms. Sites are identified by letter (ill. 3), Firuzi number (ill. 4), or by the ill. 3 grid number. All sherds are grit tempered and have smooth surfaces unless burnishing is noted. The descriptions follow the convention: site designation/surface color/paste color. **A.** R/buff/buff and grey; **B.** Firuzi 4/buff/red and grey; **C.** 6172-8895/buff/buff and grey; **D.** 6172-8895/burnished red/red; **E.** 5996-8778/red/red; **F.** Firuzi 2/red/red and grey; **G.** 5980-8779/red/buff; **H.** 6305-8576/buff/buff; **I.** 5996-8778/red/red and grey; **J.** Firuzi 3/buff/red and grey; **K.** 5996-8778/red/red; **L.** Persepolis West/red/buff; **M.** Persepolis West/grey/grey; **N.** Persepolis West/red/red; **O.** 6244-8656/red/red; **P.** Firuzi 2/red/red; **Q.** Persepolis West/red/buff; **R.** Persepolis West/grey/grey; **S.** Persepolis West/buff/buff; **T.** 5980-8779/grey/grey; **U.** Firuzi 2/red/red; **V.** Persepolis West/red/buff



Ill. 2. Achaemenid ceramic forms. Sites are identified by letter (ill. 3), Firuzi number (ill. 4), or by the ill. 3 grid number. All sherds are grit tempered and have smooth surfaces unless burnishing is noted. The descriptions follow the convention: site designation/surface color/paste color. **A.** K, Malyan/red/red and grey; **B.** K, Malyan/burnished red/red-buff; **C.** K, Malyan/burnished buff/red; **D.** K, Malyan/burnished grey/grey; **E.** Persepolis West/red/red; **F.** 6173-8614/red/red; **G.** 5996-8778/red/red; **H.** 5996-8778/red/red; **I.** 5943-8819/red/red and grey; **J.** 6014-8785/red/red; **K.** 6014-8785/red/red; **L.** 5943-8819/red/grey; **M.** 6172-8895/red/red; **N.** Persepolis West/red/red; **O.** K, Malyan/red/red-buff; **P.** K, Malyan/burnished red/red-buff (possibly Hellenistic); **Q.** Persepolis West/red/red; **R.** K, Malyan/burnished grey/grey



Ill. 3. The Persepolis Plain

if we assume they were engaged solely in pastoral nomadism during the first centuries after their arrival, then it is probable that their camp sites have not been discovered by the mound-oriented archaeological surveys conducted in the region to date. As unsatisfactory as it is, this assumption provides at least a hypothetical explanation for the fact that no early Achaemenid ceramic assemblage has yet been identified in the Persepolis region.

We must conclude that the known Achaemenid mounded sites and stone building ruins constitute a fair sample of all sedentary Achaemenid settlements in the plain. The settlement system discussed in this paper is therefore assumed to represent the cultural landscape in the Persepolis plain and surrounding districts from a date soon after the end of Cyrus' reign until the social and economic changes following Alexander's conquest.¹⁰

ARCHAEOLOGICAL SITES

The present inventory of Achaemenid sites in the lower Kur River Basin (ill. 3) includes mounds,

building sites characterized by stone masonry remains, irrigation works, and a stone paved road. These sites are assigned to the Achaemenid period with some assurance on the basis of ceramics, architectural style, or stone cutting techniques. There are an additional 18 settlement or individual building sites with less secure evidence of Achaemenid components. Finally, there are 7 quarry sites, several additional irrigation works, and a number of small monuments (fire altars, exposure platforms, and ossuaries), some of which may be Achaemenid. It should be noted that neither Persepolis, and its immediately surrounding buildings, tombs, features, and quarries, nor Naqsh-e-Rustam (ill. 3, Q) are included among the sites enumerated.¹¹

There are 27 mounds scattered across the plain (ill. 3, symbol 1) that may be reasonably interpreted as villages or hamlets. These sites are generally very small mounds less than 1 ha. in area, seldom more than 2 m. in height, or they are terminal components on larger multi-component mounds, often clearly limited in extent to only a portion of the earlier mound.

¹⁰ In the following discussion "Early Achaemenid" refers to sites believed to be earlier than the initiation of construction at Persepolis, ca. 520 B.C.

¹¹ For small monuments in the Persepolis region see Vanden Berghe (supra n. 4) 20-58; D. Stronach, "The Kuh-i-Shahrak Fire Altar," *JNES* 25 (1966) 217-27.

In addition, there are six large sites and several isolated buildings that warrant additional description.

The first of these, here designated Firuzi, after the nearest village (ill. 3, S and ill. 4, Firuzi) is a complex cluster of mounds and surface sites centered around a point 4 km. west of Persepolis. There are 12 reported sites in the cluster, of which nine are firmly and one less securely identified as Achaemenid. The recorded elements of Firuzi are cataloged here following the numbers indicated on ill. 4.¹²

Firuzi 1 is a cluster of six mounds. The largest is oval (100 × 50 m., 1.4 m. ht.) with late Islamic pottery.¹³

Firuzi 2 is a large cluster of mounds within a rectangular area (1500 × 500 m.). The highest mound (150 × 100 m., 3.8 m. ht.) is surrounded by a roughly rectangular group of five mounds (1.2 m. maximum ht.). A second large mound to the east is irregular in shape (ca. 300 × 200 m., 1.6 m. ht.). There are at least 12 other small mounds in the area. Achaemenid pottery predominates but some earlier sherds are present.

There are also fragments of seven saddle querns and a green stone bowl fragment.¹⁴

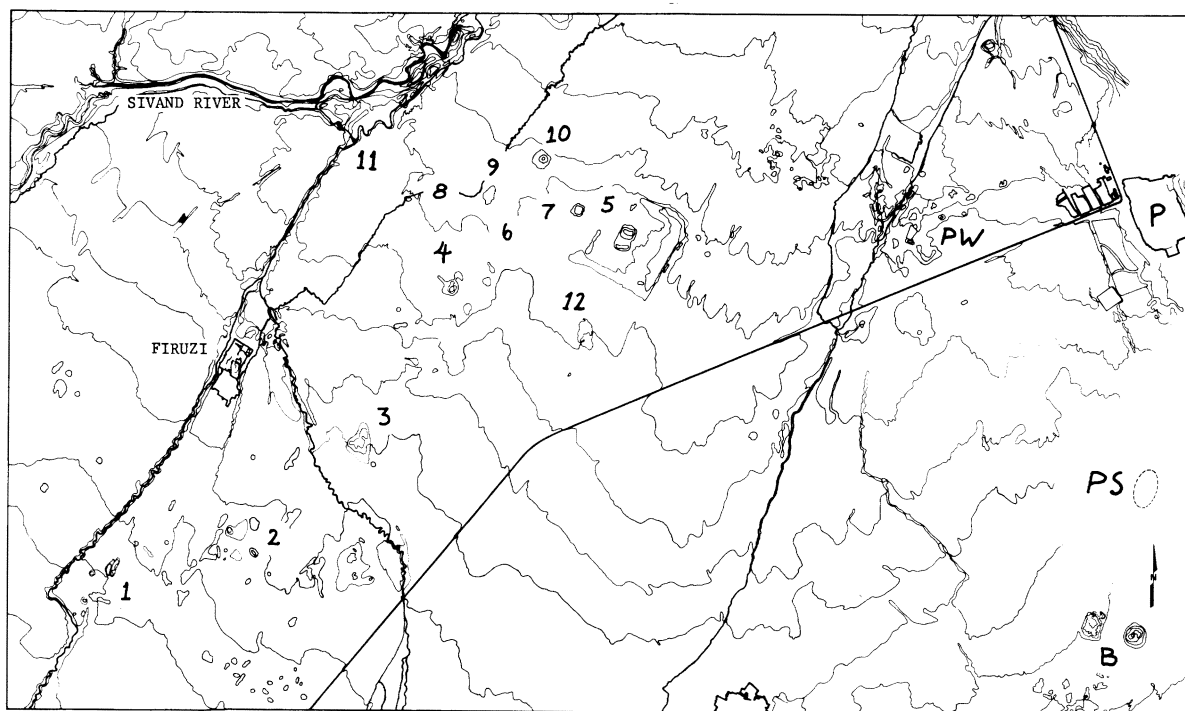
Firuzi 3 is a roughly oval mound (200 × 100 m., 2.7 m. ht.) with low extensions to the east. Achaemenid pottery is present, but less frequent than earlier sherds.¹⁵

Firuzi 4 is a circular mound (100 m. dia., 4 m. ht.). Achaemenid pottery, black and white stonemasons' debris, and a bronze fragment are present.¹⁶

Firuzi 5 consists of a central sub-rectangular mound (160 × 100 m., 2.5 m. ht. north, 1.2 m. ht. south) surrounded on three sides by a rectangular enclosure (560 × 450 m., 2 m. ht. northeast corner). Very little pottery, probably Achaemenid, is present.¹⁷

Firuzi 6 is a surface site with the remains of a black stone monumental winged animal gate-way. Absence of toothed chisel marks and use of iron dowel attachments indicate an early Achaemenid date to A.B. Tilia.¹⁸

Firuzi 7 is a circular mound (80 m. dia., 1.9 m. ht.)



Ill. 4. Archaeological sites in the Persepolis-Firuzi district. 1–12 Firuzi sites, P Persepolis, PW Persepolis West, PS Persepolis South, B Tal-e Bakun A and B

¹² Several of the Firuzi sites were surveyed by Vanden Berghe but it is not possible to say which ones with confidence on the basis of his descriptions and small-scale map. See L. Vanden Berghe, "Archaeologische Navorsingen in De Omstreken Van Persepolis," *Ex Oriente Lux* 13 (1954) 405 and map 5. Other documentation for the Firuzi sites is provided infra ns. 13–23. Ill. 4 is based on a 1:5000 scale map prepared for the Dorudzan multi-purpose project and published by the National Cartographic Centre of Iran, 1966.

¹³ Ceramic classification by personal communication from the late Andrew Williamson, based on sherds from WMS.

¹⁴ Jacobs (supra n. 7) 132; T. C. Young, Jr., survey record sheets, personal communication; WMS.

¹⁵ Jacobs (supra n. 7) 138–41; Young (supra n. 14); WMS.

¹⁶ Tilia 82; Young (supra n. 14); WMS.

¹⁷ Young (supra n. 14); WMS.

¹⁸ Tilia 82–83.

that produced no surface finds. Some 65 m. SE of the mound is a structure made of reused white stone blocks, possibly to form a canal bridge. An Achaemenid date is evidenced by *anathyrosis* borders and dovetail clamp hollows; an early date is indicated by the absence of toothed chisel marks.¹⁹

Firuzi 8 and 9. Firuzi 8 is a small mound not precisely located on ill. 4. Firuzi 9 is an irregular oval mound (120 × 70 m., 1.2 m. ht.). Both mounds produce black stone sculptural fragments, baked bricks, and Achaemenid pottery. Tilia considers the sculptural fragments and a capital found on one site as Achaemenid, probably early.²⁰

Firuzi 10 is a circular mound (110 m. dia., 4.3 m. ht.). Low relief glazed brick fragments (green, yellow, blue, and white) and Achaemenid pottery are present. This site is a building decorated with glazed brick or, more probably, a glazed brick production site. Similar bricks are found on a smaller mound to the north.²¹

Firuzi 11 is a surface site and associated mound (50 × 30 m., 1 m. ht.). Finds from the mound include Achaemenid pottery, baked brick animal sculptural fragments, and plain baked bricks. The remains of a stone and unfired mud brick building with a black limestone door sill, white stone foundation slabs, and 12 tori (one still in place), are located nearby. Technical and stylistic attributes lead Tilia to the conclusion that this building is early Achaemenid, contemporary with the Dasht-e Gohar palace.²²

Firuzi 12 is an oval mound (180 × 90 m., 1.8 m. ht.) partially destroyed by modern brick kiln excavations. Sasanian and late Islamic pottery is present.²³

Although it is apparent that we cannot fully understand the Firuzi archaeological sites without additional intensive survey and excavation, it is nevertheless beyond question that the region encompasses an exceptional concentration of Achaemenid sites with evidence of sumptuous buildings, ordinary habitation mounds, and production sites. The contemporaneous occupation of these sites cannot be unequivocally established on present evidence. It is nevertheless reasonable to suppose that the fine early buildings continued in use, perhaps with altered functions, after the production shops and associated habitations were constructed. The Firuzi sites, despite any chronological uncertainty, clearly occupy a unique status in the Achaemenid settlement system.

The second largest site in the inventory is a com-

plex group of low mounds here designated Persepolis West (ill. 4). The site is transected by two large irrigation canals, a number of small ditches, and various non-archaeological excavations, making it difficult to estimate the area of the site, which must be at least 25 ha. The highest mound in the group rises less than 3 m. above plain level. The density of Achaemenid sherds on the surface is relatively high and there is considerable stylistic diversity (ill. 1). Baked bricks and stone vessel fragments also occur on the surface.²⁴ There is a recent Islamic village site on the north edge and a large earlier Islamic site just to the northwest.

Although Persepolis West is much disturbed, it appears originally to have been a single mound or dense cluster of contiguous mounds, topographically comparable to ordinary Near Eastern town sites, in contrast to the more dispersed, open topography of Firuzi. On strictly archaeological evidence Persepolis West and Firuzi should be considered separate sites (as shown in Table 1) but consideration of the historical evidence suggests that, taken together, they constitute a provincial city or town (cf. *infra* p. 23).

There are four 6–8 ha. sites, considered to represent small towns, below Persepolis West in the settlement hierarchy. These are cataloged following the designations on ill. 3:

Site M is an oval group of connected mounds (ca. 400 × 150 m., 3 m. ht.). The site of an Achaemenid building, indicated by a foundation slab and 11 tapered cylindrical stone column bases, is located about 700 m. SE of the mounds. A stone paved embankment runs between the mound and the mountain from a point near the stone building. Achaemenid pottery is found on the mound and along the paved embankment. No pottery is found at the building site but Tilia dates the column base to the time of Darius on the basis of style and the presence of toothed chisel marks.²⁵

Site R is an oval mound (420 × 185 m., 2 m. ht.). Achaemenid and prehistoric pottery is present.²⁶

Site W (South) is an oval mound (ca. 8.2 ha.) located about 1 km. south of Persepolis. No pottery is reported from the mound but one early column torus similar to those at Dasht-e Gohar comes from the mound and 3 others come from a nearby field.²⁷

Site Y is the remains of at least 4, possibly 6, Achaemenid stone buildings around Band-e Amir village. Two of these buildings, noted by Herzfeld, are located

¹⁹ Tilia 84; WMS.

²⁰ Tilia 83.

²¹ Tilia 84–85; WMS.

²² Tilia 80–82.

²³ Williamson (*supra* n. 13); WMS.

²⁴ Vanden Berghe (*supra* n. 12) 405; WMS.

²⁵ Tilia 85–89, esp. 87, n. 1. See also Stronach (*supra* n. 3) 103, n. 140; WMS.

²⁶ WMS.

²⁷ Tilia 80.

1 km. west of Band-e Amir in association with an artificial embankment, traces of which are also visible beyond the mountain 2 km. further west. The other buildings are all closer to Band-e Amir but in scattered locations. Dasht-e Gohar type tori in black stone, rough white stone slabs, and stonemasons' debris characterize the latter group of sites. Numerous other tori have reportedly been discovered by the people of Band-e Amir. No pottery has been reported.²⁸

The characterization of sites M, R and W (South) as small towns is based entirely on the size of the mounds, and in the case of sites M and R on the extent and density of Achaemenid surface sherd scatter. The status of site Y is more problematic; no mounds or surface pottery concentrations have been reported and Herzfeld suggested that one of the site R buildings was "perhaps a Paradeisos."²⁹ Still, the large number of reported buildings suggests something more substantial than a few isolated garden houses. There are many deep canals with immense spoil heaps from centuries of canal cleaning on both sides of the river at Band-e Amir.³⁰ Thus conditions are exceptionally difficult for surface survey and a site of considerable proportions could remain undetected under or beside the modern town. Site Y will be treated as a small town in the following analysis but the reservations expressed above should be kept in mind.

The fact that site W (South) was only recently discovered and that site Y is of equivocal character raises an important archaeological issue. As stated earlier, analysis shows that in general only about 30–50% of the mounded archaeological sites have been discovered. Although small, isolated low mounds are least likely to be discovered, there is also a tendency for more extensive low mounds or clusters of low mounds—both types characteristic of the Achaemenid period—to be underrepresented in the site inventory. Such sites could be located anywhere in the valley, but are more likely to remain undiscovered in regions of low settlement density simply because the survey search pattern is coarser there than in regions with many sites. In addition, earlier sites located within extensive mounded Islamic sites or under modern villages are less likely to be discovered. A notable characteristic of larger Achaemenid sites is their association with stone masonry remains, either within the site or

nearby. With these observations in mind, a number of sites stand out as possible Achaemenid town sites, although the evidence is insufficient for positive identification. A brief catalog of these sites, following the designations on ill. 3, will allow their status to be evaluated:

Site C, Bard Burideh I is a large mound (dimensions not reported) associated with an Achaemenid building on a stone platform (ca. 20 × 25 m.) overlooking a ruined bridge or aqueduct across the Rud-e Bidun, a small tributary of the Kur River. Tilia has confirmed Bergner's original identification of the building and bridge as Achaemenid, but a more precise date has not been proposed: there are both early (broad swallow-tail clamp hollows) and later (toothed chisel marks) attributes present. Behind the building "... there extends a vast mound covered with potsherds" and some 36 partly buried stone blocks, probably from the building. The date and character of the pottery on the mound is not stated.³¹

Site G, Tol-e Gachi, is an extensive (dimensions unknown) complex of low mounds. Two stone column bases, two oil-press stones, and medieval and late Islamic pottery are present. No Achaemenid pottery is known but much of the site remains unexplored. There is an Achaemenid stone quarry just east of the site.³²

Site H, Tol-e Asia, is an unmounded talus slope site. Stone wall foundations are visible at the surface. A stone column base, late Islamic sherds, and a small group of possibly Achaemenid grey sherds are present. The area of this site is difficult to establish, stone foundations and pottery scatters extend almost continuously along the talus for about 1 km. There are two uniquely decorated ossuary niches in the bedrock and a rectangular "exposure platform" cut into the top of a huge isolated stone block near the site.³³

Site J, Mian Qale, is an irregular complex mound (ca. 300 × 150 m. × 3 m. ht.) with Islamic and possibly Achaemenid sherds.³⁴

Site L (Tol-e Baiza). Baiza is an oval mound (6.9 ha.) with evidence of fortifications visible in aerial photographs. Several surveys of the mound have failed to produce Achaemenid ceramics, and stone architectural elements observed near the site do not appear to be Achaemenid. Still, Baiza is one of the very few un-

²⁸ Surveys by E. Herzfeld and H. Khosrovani reported in Tilia 85, n. 1.

²⁹ Reported in Tilia 85, n. 1.

³⁰ E.F. Schmidt, *Flights over Ancient Cities of Iran* (Chicago 1940) pl. 24.

³¹ Bergner 1, 2; Tilia 89–90. The quotation is from Tilia, but Bergner also mentions the mound.

³² Bergner 3; WMS.

³³ Bergner 3, 4; Vanden Berghe (supra n. 4) 45, pl. 62d; WMS.

³⁴ WMS.

disturbed fortified Sasanian-Islamic sites on the plain with an exceptional depth of cultural deposit. It is possible that an Achaemenid town site remains buried under the later town.³⁵

Site K, Tal-e Malyan. Malyan, securely identified on epigraphic evidence as Anshan, is a large fortified mound (area enclosed by fortification: ca. 200 ha.; mound within walls: ca. 130 ha.).³⁶ The site is classified as a small Achaemenid site on the basis of a few surface sherds (ill. 2). Much of the western half of the site is covered by a Sasanian-Islamic deposit of unknown depth that could conceal a large Achaemenid settlement. A significant number of Kaftari sherds (ca. 2000 B.C.), Banesh sherds (ca. 3000 B.C.) and even a few Bakun sherds (ca. 4000 B.C.) were discovered in the western half of the site in a 1% stratified surface collection. However, no Achaemenid sherds were found in any of the surface sampling units.

Some early kings of the Achaemenid dynasty were styled "Kings of Anshan," but it is not clear that the name refers to a city or settlement rather than to the land over which the kings ruled. Anshan is mentioned several times in the Persepolis Fortification texts but with far less frequency than a number of other places in the valley.³⁷

Site U, Istakhr. Istakhr is an oval mound (1400 × 650 m., 10–16 m. ht.) with clear evidence of streets, buildings and fortifications visible in aerial photographs.³⁸ The presence of Achaemenid architectural elements at Istakhr is undisputed and has encouraged the belief that a pre-Islamic, possibly Achaemenid, sanctuary existed at the site of the mosque. Whitcomb, in a recent study of the material excavated by Herzfeld and Schmidt, has concluded that the Achaemenid columns and capitals were installed in early Islamic times and that no ceramic or other evidence supports the notion of an Achaemenid settlement at the site.³⁹ However, the great size and depth of the site make it inadvisable to rule out the possibility that a substantial Achaemenid site is buried below later deposits.

While there is no direct evidence that any of these sites are Achaemenid towns, it is clear that our knowledge of them is too fragmentary to rule out that possibility. Since it is probable on theoretical grounds that an additional eight or nine Achaemenid town sites exist undiscovered in the valley, the sites just described should command special attention in any future survey.

Several other sites require brief comment (following their designations on ill. 3):

Site E is the findspot of an Achaemenid column base near a small mound (60 × 30 m.) and sherd scatter (ca. 130 × 50 m.) with Islamic, Kaftari (ca. 2000 B.C.), and a small number of polished red ware sherds that may be Achaemenid.⁴⁰

Site F is the remains of a five-room stone building (ca. 40 × 30 m.) situated on a spur of the mountain ca. 30 m. above plain level. A stone ledge 5 m. wide is cut into the mountain below the building and three osuary niches are cut into the mountain nearby. Kleiss attributes the ceramic surface finds to the Achaemenid period.⁴¹

Site P is the remains of another stone building, similar to site F, and a later tower building. Kleiss classifies the earlier building as probably Achaemenid.⁴²

Site T is an early Achaemenid columned building near Takht-e Rustam, Dasht-e Gohar.⁴³

Site V is a talus slope surface site and associated quarry. Finds include several fluted grey limestone columns and worked slabs. Toothed chisel marks are present. Pottery is not reported.⁴⁴

To summarize briefly, the Achaemenid settlement system includes 39 identified habitation sites and 18 possible sites with insufficient evidence for classification. An examination of the characteristics of these sites and an analysis of site discovery ratios in the valley suggests an inventory of known and hypothetical undiscovered sites as indicated in Table 1.⁴⁵

The reconstruction presented in Table 1 assumes a general site discovery ratio of 30% but also assumes

³⁵ Photograph by E.F. Schmidt, University of Chicago, Oriental Institute Archives, Photograph NE-495; WMS.

³⁶ E. Reiner, "The Location of Anshan," *RAssyr* 67 (1973) 57–62; J. Hansman, "Elamites, Achaemenians and Anshan," *Iran* 10 (1972) 105–25.

³⁷ Hallock (1969) 668.

³⁸ Schmidt (supra n. 30) pls. 8–10.

³⁹ D.S. Whitcomb, *Trade and Tradition in Medieval Southern Iran* (Diss. University of Chicago 1979) 155–60; Schmidt (supra n. 3) 105–19.

⁴⁰ Bergner 3; WMS.

⁴¹ W. Kleiss, "Ein Abschnitt der achaemenidischen Königsstrasse

von Pasargadae und Persepolis nach Susa, bei Naqsh-e Rostam," *AMIran* 14 (1981) 45–53. For a similar rock-cut road near Pasargadae, see Stronach (supra n. 3) 166–67.

⁴² Kleiss (supra n. 41) 45–46.

⁴³ Tilia 73–80.

⁴⁴ D. Whitcomb, "A New Achaemenian Site Near Persepolis," *Bulletin of the Asia Institute* 1 (1969) 48–49.

⁴⁵ Isolated buildings are classified as hamlets in Table 1, although they may be functionally distinct. The 18 sites with insufficient evidence for classification as Achaemenid are not counted among the "known sites" in Table 1.

Table 1: Archaeological Sites and Population in the Persepolis Plain

Settlement Type	Number	Size (ha.)	Total Area (ha.)	People/ha.	Estimated Population
Firuzi	1	600	600	40	24,000
Persepolis W.	1	25	25	100	2,500
Towns, known	4	6-8	28	100	2,800
Towns, hypothetical	9	6	54	100	5,400
Towns, sub-total	13		82		8,200
Villages, known	7	1-2	9	100	900
Villages, hypothetical	21	1.5	32	100	3,200
Villages, sub-total	28		41		4,100
Hamlets, known	26	<1	13	100	1,300
Hamlets, hypothetical	60	0.6	35	100	3,500
Hamlets, sub-total	86		48		4,800
Total, known	39 (30%)		675 (85%)		31,500 (72%)
Total, hypothetical	90 (70%)		121 (15%)		12,100 (28%)
Total, combined	<u>129</u>		<u>796</u>		<u>43,600</u>

that larger sites are more likely to be discovered than smaller sites. For this reason a relatively high proportion of the estimated total site area (85%) and of the estimated total population (72%) is estimated from known, rather than hypothetical sites. The difference between area proportion (85%) and population proportion (72%) results from the low population density assigned to Firuzi, giving it less weight in the total population estimate than in the total site area estimate. The estimates of population density within settlements are based on data from modern Iranian villages.⁴⁶ The lower density estimate for the Firuzi settlement assumes that considerable space in the settlement was devoted to elite houses, gardens, and outdoor production areas such as stonemasons' yards. The estimated sedentary Achaemenid population is 43,600 as compared to 140,000 inhabitants in 1966.⁴⁷

It is impossible to predict the location of undiscovered sites, but some general observations are warranted on theoretical grounds. The archaeological survey model indicates that contrast between high-site-density and low-site-density sub-regions will be overstated for non-probabilistic surveys such as those con-

ducted in the Persepolis plain. Achaemenid sites generally conform to the distribution pattern of all known sites in the valley, leading to the expectation that additional sites are most likely, but not exclusively, to be found in the low-density regions apparent in ill. 3. If the proposed functional settlement hierarchy indicated in Table 1 is a correct interpretation of the observed site size hierarchy, then some general predictions from location theory are admissible. Towns should be more widely dispersed than villages and hamlets, each town offering administrative, economic, and religious services to a group of smaller settlements. This model provides a moderately strong argument in favor of towns in the western end of the valley, between sites L and G, in the north central region (site H), on the northern periphery (site C), and reinforces the identification of site Y as a town.

It is acknowledged that ample scope exists for disagreement concerning the hypothetical numbers and estimates in Table 1, but it should be evident that a settlement pattern reconstruction using only the known archaeological sites is certain to underestimate the population and the number of settlements.

⁴⁶ C. Kramer, *Village Ethnoarchaeology, Rural Iran in Archaeological Perspective* (New York 1982) 155-81.

⁴⁷ The 1966 population is not exactly comparable to the Achaemenid estimate since modern census districts do not coincide with

the archaeological survey region and the proportion of the modern population counted for several districts is an estimate. See the Iranian Statistical Centre, *Village Gazetteer 23, Fars Ostan (Province)* (Tehran 1970) Shiraz Shahrestan.

IRRIGATION WORKS

Two irrigation works in the valley can be assigned to the Achaemenid period with some confidence: Band-e Dukhtar and Bard Burideh II (ill. 3, A and B). Both of these sites were originally reported by Bergner, who considered them to be Achaemenid.⁴⁸ Excavations at both sites by Nichol produced no conclusive stratigraphic or artifactual dating evidence, but Nichol argues against an Achaemenid date for Band-e Dukhtar while accepting the date for Bard Burideh II.⁴⁹ Band-e Dukhtar was later dismantled and moved to a new site above the Dorudzan reservoir water level. At that time G. Tilia, who supervised the removal, examined the entire structure, including parts that Nichol could not observe, and concluded that the structure is of Achaemenid date.⁵⁰ Tilia was also able to confirm the Achaemenid date for Bard Burideh II. I will attempt to show that both structures are entirely comprehensible as parts of the Achaemenid settlement, irrigation, and road systems.

Nichol identified two structural phases at Band-e Dukhtar, the later of which controlled water from a small spring-fed stream. Our concern is with the earlier structure, which directed water from the Kur River into an irrigation canal of substantial capacity. The extant structure consists of a double-arched canal head partly carved out of bedrock and partly constructed of large dressed stone blocks. Evidence of fixtures to control sluice gates was discovered on the upstream side. The remains of a stone weir were discovered extending at an angle into the Kur River stream bed. The weir would have raised water and directed it into the canal but is unlikely to have formed a permanent reservoir. Below the gates the canal is partly carved out of bedrock and partly retained by a double stone wall.⁵¹

The canal served by Band-e Dukhtar is of extraordinary length (ca. 50 km.), unusual construction, and difficult to interpret as a properly engineered, economically viable irrigation system. Bergner reports traces of the canal for a distance of 2.5 km. downstream. On the right bank of the Rud-e Bidun, opposite Bard Burideh I (ill. 3, C), a gently curved channel approaches the river, suggesting that the ruins in the Rud-e Bidun bed at that point may have served as an aqueduct, as well as a bridge.⁵² Beyond

Bard Burideh I the canal is obscured by modern irrigation canals until a point near the SE promontory of Kuh-e Shahrak, where evidence of the ancient canal is observed rounding the point and following a straight course in an easterly direction.

This stretch of the canal was observed by Nichol on aerial photographs and from a helicopter. As a result of these observations, he excavated a trench (108 × 1 m.) across the projected path of the canal at a small late Islamic site designated Tol-e Shahrak (ill. 3, D). Excavations revealed an early 20th-century house, a small irrigation canal (7 m. wide, 3 m. deep) and a stone paved road. As depicted in the section, the canal is completely buried in the site, with no surface indication of its presence. This circumstance, together with the comparatively small dimensions of the excavated canal, makes it unlikely that the canal indicated on the surface (ca. 60 m. wide, 3 m. deep) is the same as the excavated canal. This point cannot, however, be confirmed, because the exact location of Tol-e Sharak is not reported and its relation to the visible canal traces cannot be established. Stratigraphically, the excavated canal is just below the 20th-century house and later than a paved road, ascribed to the Achaemenid period by Nichol.⁵³

Further to the east there is a straight, narrow, ramp-like strip of land about one meter above the surrounding plain. This feature is perpendicular to the Rud-e Main and occurs on both banks, suggesting an aqueduct across that stream. There is a dam across the Rud-e Main 2.5 km. north of this feature and a quarry with carved stone steps at the west end of Kuh-e Hasan just to the east. The relationship of these features to the hypothetical causeway-aqueduct is not apparent.

Beyond Rud-e Main traces of the canal can be followed along the foot of Kuh-e Hasan to a point NW of Kuh-e Istakhr (the mesa north of site J, ill. 3) where it turns south, circles Kuh-e Istakhr and forms a loop north of Kuh-e Qale (ill. 3, N).⁵⁴

Thus we have a canal traversing some 50 km. from the weir at Band-e Dukhtar to feature N (ill. 3). Nichol supposed that Band-e Dukhtar would have provided irrigation to the Dashtak plain NW of Kuh-e Shahrak (ill. 3, NW of site C) and Abarj, east of Shahrak (ill. 3, east of D). This explanation is very

⁴⁸ Bergner 1–3.

⁴⁹ Nichol 262–63, 277–78.

⁵⁰ Tilia 90; also A.B. Tilia, *Studies and Restorations at Persepolis and Other Sites of Fars* (IsMEO Reports and Memoirs 16, Rome 1972) 69–70, figs. 164–69.

⁵¹ Nichol 247–65.

⁵² The canal is traced on the Dorudzan map (supra n. 12), which has one meter contour intervals and shows minor topographic fea-

tures; Bergner pl. 5; Nichol 264.

⁵³ Nichol 278–83.

⁵⁴ Schmidt observed sections of the embankment and the reservoir during his aerial survey of the valley and indicates them on his survey map without comment. Schmidt (supra n. 3) fig. 97. The embankment at the foot of Kuh-e Shahrak is also visible in Schmidt (supra n. 2) 54, fig. 20.

unlikely. There is no trace of canals to the high ground in either district. On the contrary, where a canal can be traced it crosses the low-lying ground of both districts. Furthermore, both districts are exceptionally well watered by springs, which eventually form the Bidun and Main rivers respectively, and are unlikely to have required additional water.

The construction and functional details of the canal system are far from clear. Those stretches of the canal crossing the plain appear as a simple ditch with no reported construction details. Along the foot of the mountains the canal appears to be a ditch dug into the talus in some places, but more typically takes the form of an embankment following the lower contours of the mountain; presumably water flowed between the mountain and the embankment. The embankment has been breached in several places revealing a stone cobble inner core covered by a thin mantle of earth. Although available data do not permit a precise calculation, the slope of the canal appears to be about 0.7 m. per km.

That the canal delivered water to the vicinity of feature N (ill. 3) is virtually certain. The perimeter of feature N is defined by embankments, suggesting a shallow reservoir, but there is also clear evidence of a canal leading water into the plain from the NE corner of feature N.

The notion that feature N is a reservoir accounts for the otherwise enigmatic embankments that form its southwestern and eastern perimeters. However, there is only one Achaemenid site in the plain below the reservoir and no topographic evidence of a canal leading across the Sivand River, to Firuzi. We will return to this problem in connection with the Persepolis texts.⁵⁵

The second Achaemenid irrigation work, Bard Burideh II (ill. 3, B) is a massive stone structure 82 m. long, 6.5 m. wide, and 3.4 m. high. There are five openings through the structure, with a sixth to be reconstructed in the central demolished section. These openings, 1.85 m. high, are rounded on the upstream (western) side where they are 2 m. wide, and narrow to 1.5 m. wide on the downstream side. The level top surface does not extend to the west edge, being only 5.5 m. wide. The structure is made of well dressed limestone blocks up to $3 \times 2 \times 1$ m. in size, joined by iron clamps fitted into swallow-tail sockets.⁵⁶

⁵⁵ The original plan for the new Dorudzan irrigation system was for the left bank canal to follow the "... course of an ancient canal crossing the Sivand and to the plains below Persepolis," from the Main river eastwards. See Justin and Courtney, *Principal Report of the Dorudzan Project* (Tehran 1952) 9 and pl. 1.

⁵⁶ Bergner 2-3, pls. 5-7; Nichol 269-78.

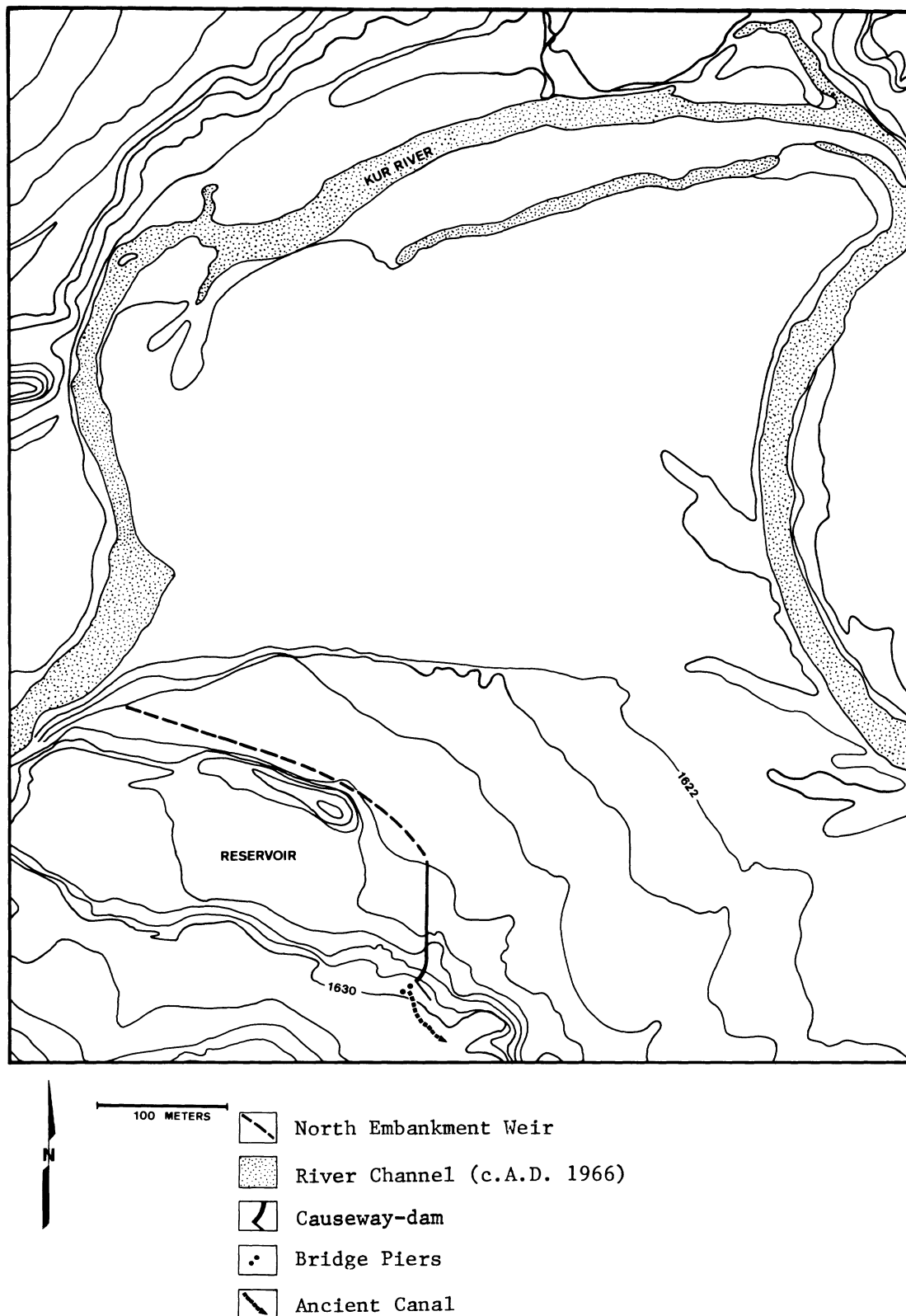
⁵⁷ The plan of the excavation units and the causeway structure

Excavations conducted by Nichol reveal a wall perpendicular to the main structure as it curves to the west at the south end near the rocky right margin of the gorge. Beyond the cross-wall, to the west, Nichol found stone footings and carbonized wood. The upper strata in his trenches at the south curve contained a rock pile and stone chips interpreted as the remains of a masons' yard, in use during the removal and reworking of stones from the Achaemenid structure for an Islamic dam upstream. The quarry for the original structure is located on the mountain slope some 250 m. SW of the structure.

Bergner offered a reconstruction in which the observed structure formed the downstream (eastern) dam of a reservoir enclosed on the north and east by stone rubble embankments, the remains of which he reported at the western end of the reservoir. The inexplicable aspect of this reconstruction is that the western embankment was positioned so as to direct the flow of the river *around*, rather than into, the reservoir. Nichol planned a test trench 40 m. west of the north end of the main structure to investigate the north embankment reported by Bergner; however, the area was bulldozed before excavations could be conducted. Nichol reports that the site of the proposed trench was examined by the excavation geologist and identified as a sand bar. Still, the position of the proposed trench is 20 m. SE of the embankment as represented on Bergner's plan (ill. 5). We can only conclude that the structural nature of Bergner's embankment cannot be determined. As represented on both Bergner's plan and the Dorudzan map it was 30 m. wide, 4 m. in ht. (maximum dimensions) and extended 200 m. west to the present channel of the Kur River, which turns north at that point. Bergner's western embankment, enclosing the upstream end of his reconstructed reservoir has not been further investigated and is anomalous in any case, if the reservoir was intended to impound Kur River waters.⁵⁷

Nichol concluded that the main structure is not a dam; rather it is a causeway between the bed rock 15 m. north of the main structure and the wooden bridge spanning the Kur River at the south end of the causeway. The causeway itself, with its 6 flood gates, simply served to keep the road dry during flood stage. Nichol's proposed bridge at the south end of the causeway would have spanned a maximum of 25 m.

published by Nichol appears to be accurately surveyed, but the locations of the quarry, the modern road, the Soon canal and the Kur River are apparently only sketched in without survey measurements and do not agree with Bergner's map, which is in close agreement with the Dorudzan topographic map (*supra* n. 12). See Nichol 275, n. 49, fig. 9; Bergner pl. 5. Ill. 5 is compiled from all three sources.



Ill. 5. The Bard Burideh II Causeway-weir

and the present channel of the river is only about 25 m. minimum width during most of the year. However, the present channel of the river just upstream is about 1622 m. above sea level and the minimum elevation of the hypothetical channel under the bridge is at 1626 m., rising rapidly to 1630 m. Thus Nichol's hypothesis requires either an artificial impounding of the entire Kur River, or a down cutting phase during the past two millennia, the former to raise, or the latter to lower the channel of the river by a minimum of 4 m. There is no independent evidence to support either of these solutions.

I would propose a compromise reconstruction, by no means entirely satisfactory, but with greater utilitarian virtues and less radical hydrological implications. With Bergner, I propose a stone-and-earth embankment weir anchored to the north end of the causeway-dam structure or to bed rock at the same elevation to the north (ill. 5). This weir would intersect the Kur River channel some 200 or 300 m. west of the causeway-dam, directing water, but not the entire flow of the river in flood stage, into a small reservoir west of the causeway-dam. The water level in the reservoir could be controlled by sluice gates operating in the notches reported by Bergner on the upstream side of the openings through the causeway-dam. Water from the reservoir would flow into a canal situated between the mountain and the cross-wall reported by Nichol at the curved south end of the causeway-dam. The wooden bridge proposed by Nichol would span the canal. This canal is in the position proposed by Bergner and would have followed the course he traced along the mountain for 12 km.⁵⁸

If this reconstruction has merit, then Bard Burideh II was the Achaemenid version of the Soon canal irrigation system, first constructed in prehistoric times and known to have been reconstructed several times in the Islamic era.⁵⁹ The Soon canal system waters the Ramjerd district along the right bank of the Kur River (ill. 7). The line of the main canal (ill. 3, I) follows a low rise on the plain, probably resulting from operation of the canal and its predecessors for several millennia.

The group of Achaemenid sites in the Soon irrigation district represents 33% of the known sites and 28% of site area, exclusive of Firuzi and Persepolis West. Thus the Soon district, as in former times, sup-

ports a higher density of rural population than any other district in the plain.

There are a number of other artificial topographic features that may be the remains of ancient irrigation systems: an embankment along the SW edge of the valley (ill. 3, across the NE corner of grid square 59-85), several embankments in the Soon district (ill. 3, NE corner of grid square 62-85 and west of site J, on the right bank of the river), and west of Kuh-e Istakhr, perpendicular to the Band-e Dukhtar canal. None of these remains can be dated and their function is unknown. There is circumstantial evidence that two other features may be Achaemenid. The first of these is an embankment, first noted by Herzfeld (ill. 3, west of site Y), which is probably an early distribution canal from Band-e Amir.⁶⁰ Band-e Amir, in its present configuration, was constructed by Adud-Ad-Dawlah in A.D. 960. One can speculate on an earlier Sasanian or Achaemenid foundation of the dam, but no substantial evidence is available in support of the theory. The presence of several Achaemenid buildings, and perhaps a considerable town at the site is no more than suggestive.

The second possibility is a pair of canal embankments and an enigmatic site on the left bank of the Kur River NW of Band-e Amir (ill. 3, X). The two canals diverge at a point just north of a small Achaemenid site. One canal runs for ca. 2 km. to the SW and terminates near Tal-e Anjiri on the left bank of the Kur River. Tal-e Anjiri is a group of tall (maximum ht. above plain, 5 m.) mounds forming a basin through which the Kur River appears to have flowed at some time. The other branch of the canal runs to the ESE for several km. with a modern canal following its course for some distance. Water flowing in the modern canal originates at a weir above Istakhr (ill. 3, U), which may have been the source of water for the ancient canal as well. The function of Tal-e Anjiri remains a mystery and its association with the canals may be coincidental. The presence of a concentration of Achaemenid sites near these canals (ill. 3, between sites X and Y) is suggestive, but by no means conclusive evidence of an Achaemenid date.⁶¹

In summary there are two irrigation systems in the valley that are probably of Achaemenid construction and a third that may also be Achaemenid. The Soon system, originating at Bard Burideh II, and the hypo-

⁵⁸ Bergner 203, pl. 5; Nichol 278.

⁵⁹ For evidence concerning prehistoric use of the Soon canal see W.M. Sumner, "Proto-Elamite Civilization in Fars," forthcoming in the *Proceedings of the Tübingen Colloquium on Jemdet Nasr, November 1983*. For use of the Soon Canal in Islamic times see

Nichol 265-69; Gerhard Kortum, *Die Marvdasht-Ebene in Fars* (Kieler Geographische Schriften 44, Kiel 1976) 94-105.

⁶⁰ Reported in Tilia 85, n. 1.

⁶¹ A number of Kaftari (ca. 2000 B.C.) sites are located below the Tal-e Anjiri canal, but no other evidence supports an early date.

thetical Band-e Amir-Anjeri system are associated with clusters of Achaemenid towns, villages and hamlets. The Band-e Dukhtar system may have delivered water to the large site at Firuzi, but remains difficult to interpret.

THE ROYAL ROAD

Finally, there is archaeological evidence for the Achaemenid road connecting Persepolis with Susa. During survey I discovered a section of cobble pavement (7 m. wide) on a low embankment SW of Kuh-e Qale near site M (ill. 3). The date of this feature cannot be stated with certainty but the proximity of several Achaemenid sites and Achaemenid sherds from three different locations along its path makes an Achaemenid date probable. The fact that this pavement is on top of a low embankment raises the possibility that it may have been part of the Band-e Dukhtar canal system. However, the fact that no ancient canal can be traced to the SE of Kuh-e Qale supports the interpretation of the pavement as part of a road system around Kuh-e Qale, continuing on top of the SE embankment of the reservoir (ill. 3, N) and thence along Kuh-e Hasan past Naqsh-e Rostam to Persepolis. Site P (ill. 3) is a stone building assigned to the Achaemenid period and interpreted as a way station by Wolfram Kleiss.⁶²

Further to the NW, Kleiss reported a second Achaemenid way station (ill. 3, F). The site consists of a five-room stone building (ca. 40 × 30 m.) 40 m. above the plain. Below the building the promontory on which it rests projects to within 150 m. of the Kur River channel and the talus is sharply eroded by a small stream flowing into the river. A modern irrigation canal is cut into bedrock around the promontory and below the canal a notch with a flat floor 5 m. wide has been cut into the bedrock. Kleiss interprets this feature, reminiscent of the rock-cut road along the Pulvar River, as part of the Achaemenid road. Certainly it is not part of the Band-e Dukhtar canal since it is several meters too low.⁶³

Still further to the NE, at Tol-e Shahrak (ill. 3, D), Nichol discovered a stone paved road 5 m. wide in the lowest stratum. The south edge of the road has a curbing made of dressed stones (30 × 20 × 17 cm.) said to have been worked using the same masonry techniques observed at the Bard Burideh II Achaemenid causeway-dam. No associated finds were discovered. Con-

tinuing to the NW we encounter the ruined bridge-aqueduct at Bard Burideh I (ill. 3, C) and finally, the causeway-dam at Bard Burideh II (ill. 3, B). It should be noted that my reconstruction of the Bard Burideh II structure requires an additional bridge to span the main channel of the Kur River, presumably north of the causeway-dam (ill. 5). No remains of such a structure have been reported. Nichol also reported a dressed stone panel on the mountainside about 1 km. SW of Bard Burideh II and suggested that the panel was prepared for an inscription associated with the road, but never executed.⁶⁴ No single piece of evidence cited for an Achaemenid road is decisive. Taken as a whole, however, the evidence of a road from Persepolis along the left bank of the Kur River, either north or south of Kuh-e Qale and Kuh-e Istakhr, across the Kur River at Bard Burideh II and thence through the pass to the Ardekan plain is persuasive.⁶⁵

The Achaemenid cultural geography of the valley emerges in surprising detail from the archaeological evidence. One must now consider how well this picture agrees with descriptions from Greek and Roman sources and the Persepolis texts.

HISTORICAL SOURCES

Both Strabo and Arrian provide concise descriptions of ancient Persis in which the province is divided into three climatic zones corresponding to the hot coastal region (*garmsir*), temperate inter-mountain valleys and plains (*sarhad*), and the cold mountain region (*sardsir*) of Islamic geographers. The Persepolis plain falls in the *sarhad* region, described as wooded, abounding in streams and lakes, and lush grassy meadows. The land is said to be excellent for grazing horses, cattle and other domestic animals. Game, including aquatic birds, is plentiful and there are said to be vineyards and gardens of all sorts, producing a variety of fruits.⁶⁶

Quintus Curtius Rufus (ca. A.D. 50) describes the Persepolis region in circumstantial detail:

Then at the roots of the mountains a spacious plain slopes down, a fertile land, and abounding in many villages and cities. Through these fields the river Araxes rolls the waters of many torrents into the Medus; the Medus—a lesser river than the one which flows into it—in a southerly direction goes on to the sea, and no other river is more favorable to the growth of vegetation, and it clothes with flowers whatever it flows near. Plane trees also and poplars cover its

⁶² Kleiss (supra n. 41) 45–47.

⁶³ Kleiss (supra n. 41) 48–51.

⁶⁴ Nichol 278–79.

⁶⁵ See infra n. 123.

⁶⁶ This description is taken from Strab., *Geog.* 15.3.1 (trans. H.L. Jones, Loeb Classical Library, 1930); Arr., *Indica* 8.39.2–4 (trans. E.I. Robson, Loeb Classical Library, 1933).

banks, so that to those who view them from afar the groves along the banks seem to be a continuation of those on the mountain. For the shaded stream flows in a channel sunk deep in the soil, and over it hang hills which are themselves also rich in foliage because of the moisture which makes its way to their roots. No other region in all Asia is regarded as more health-giving; the climate is tempered on one side by dark and shaded mountains in a continuous line, which alleviate the heat, on the other by the nearness of the sea, which warms the lands with moderate heat.⁶⁷

Nothing in the archaeological record is counter to these descriptions and the Persepolis texts confirm their accuracy, point by point, with only one exception. This exception, that the mountains are wooded, has often been considered "an exaggeration since the mountains are bare and barren."⁶⁸ Today the Tang-e Boraq, above Dorudzan at the west end of the valley (ill. 7), still bears an oak-pistachio forest of considerable density as do the small passes leading towards the Persian Gates, also reported as heavily wooded by Curtius.⁶⁹ Although we have no other evidence concerning the forest cover in Achaemenid times there is certainly no compelling reason to ignore the classical descriptions, particularly in view of the known depredations of goats and charcoal burners in recent times.⁷⁰

Beyond these general geographic descriptions in the classical sources, the Persepolis administrative texts provide a wealth of data on Achaemenid settlements, agriculture, irrigation, roads, and administration. The remainder of this paper is principally concerned with the strictly geographical data contained in the texts as a means of checking and enriching the archaeological description already presented. I will consider the location of important places in central Fars mentioned in the texts, the smaller settlements associated with these places, and the evidence for irrigation and roads in the texts.

Two groups of administrative texts were discovered at Persepolis. The smaller group, from the Treasury, concerns cash payments to workers, for the most part

at Persepolis, although places as distant as Neyriz are mentioned.⁷¹ The Persepolis Fortification texts—a much larger archive—concern issues of rations, transfers of materials, and other accounting and administrative transactions. The geographical scope of the Fortification texts is extensive, but the vast majority of the texts records transactions in districts around Persepolis and along the road from Persepolis to Susa. Hallock discussed the geographical implications of these texts in a series of papers on which the following interpretation is founded.⁷²

Hallock demonstrated that four seals (nos. 1, 3, 30, and 32), and the officials who use them, define an administrative region in central Fars bounded on the north by Pasargadae, on the west by Kamfiruz, on the east by Neyriz, and on the south by Shiraz. There are at least 400 geographic names (hereafter abbreviated GN) in the Persepolis Fortification and Treasury texts.⁷³ Some of these GNs refer to countries, peoples, districts, rivers, or mountains, but over 350 of them refer to places that are reasonably interpreted as settlements. Forty-four GNs occur on tablets with one or more of the four central Fars seals. In addition, there are a number of GNs that occur in association with central Fars GNs, but on texts without one of the four geographically restricted seals. On the assumption that issues of workers' rations or transfers of large quantities of grain or wine between places is an indication of proximity, the list of places in central Fars can be expanded to include 114 GNs. A more intensive study of the texts, making use of the large list of personal names (more than 1000), administrative titles and less frequent seals would certainly yield a larger list of places in the region, but that study is beyond the scope of this paper.⁷⁴

The geographical scope of the central Fars places attested in the texts must be more precisely established before they can be usefully compared with the archaeological sites already described.

The identification of Parsa and Batrakatuš in the texts with Persepolis and Pasargadae (ill. 7) respec-

⁶⁷ Curtius, *Alex.* 5.4.6–9 (trans. J.C. Rolfe, Loeb Classical Library, 1962).

⁶⁸ Rolfe (supra n. 67) 361, n. g; it should also be noted that the "Medus" flows into Lakes Tashk and Neyriz rather than the sea. For additional comments on forests, see P. Briant, "Brigandage, dissidence et conquête en Asie achéménide et hellénistique," *Dialogues d'Histoire Ancienne* 2 (1976) 168, ns. 108, 110.

⁶⁹ Curtius, *Alex.* 5.4.24.

⁷⁰ Theodore A. Wertime, "The Furnace Versus the Goat: The Pyrotechnologic Industries and Mediterranean Deforestation in Antiquity," *JFA* 10 (1983) 445–52.

⁷¹ G.C. Cameron, *Persepolis Treasury Tablets* (OIP 65, Chicago 1949).

⁷² Individual tablets published in Hallock (1969) are cited using the PF publication number; tablets published in Hallock (1978)

are cited by the PFA publication number. Seals mentioned by number are listed in Hallock (1969) 78–81 and are discussed in all of Hallock's papers, but particularly in Hallock (1977), where he demonstrates that certain seals were used in geographically restricted regions.

⁷³ All data on the frequency of geographical names is taken from the glossary in Hallock (1969) and includes only those unpublished texts listed in the glossary.

⁷⁴ Hallock's student A.M. Arfaee is preparing a detailed study of the geographical evidence in the Fortification texts for a doctoral dissertation in progress. The analysis presented here does not rely on Arfaee, who has consulted many unpublished texts. His results will no doubt provide a more accurate and comprehensive account of Achaemenid geography in Fars.

tively is not seriously disputed and thus the center and northern boundaries of the region are established.⁷⁵ The eastern limit of the region is associated with the GN Narezzaš, which occurs 13 times in the Fortification texts and twice in the Treasury texts, but is otherwise unknown in ancient sources. The identification of Narezzaš with the modern town Neyriz was first proposed by Cameron on the basis of the resemblance between the names, but I am not aware of an etymological study. Cameron also noted the historical evidence of iron mining in the Neyriz region and suggested an association with the "coat-of-mail" makers at Narezzaš, mentioned in the Treasury texts.⁷⁶

Stein passed through Neyriz and neighboring districts in 1933–34. He provides a number of tantalizing hints: the head of a small Greek statue and Achaemenid stone architectural elements from Tal-e Zohak (near Fasa), plain red or grey pottery from Zohak and several other sites, and other fragments of evidence for a post-Chalcolithic, pre-Islamic occupation. In the absence of photographs or drawings, none of the ceramic evidence can be evaluated. However, Stein is very explicit in stating that he searched for sites around Neyriz without success.⁷⁷ More recently de Miroschedji, reporting on surveys in Fasa and Darab, mentioned the presence of Achaemenid pottery at unspecified sites, but provided no details.⁷⁸ Finally, Hansman has published an account of Achaemenid remains at Tal-e Zohak, including three illustrated Achaemenid sherds, but the exact extent of the Achaemenid surface evidence remains unknown.⁷⁹ The only other confirmed Achaemenid site along the eastern boundary of central Fars is Tepe Yahya and the Achaemenid sites in adjacent Rud-e Gushk, 400 km. to the east.⁸⁰ In terms of the evidence at hand it can only be said that Neyriz remains the most probable, but unconfirmed, location for Narezzaš.

The region is bounded on the south by Tirazziš, which occurs in 35 Fortification texts (the variant Širazziš occurs twice), and in three Treasury texts. Ti-

razziš is identified with Shiraz, again without an etymology. No mention of Tirazziš is found in other Achaemenid inscriptions. Our earliest references to Shiraz preserve the tradition of a pre-Islamic citadel and fire temples, although the city itself is counted an Islamic foundation.⁸¹ Early travelers noted the Achaemenid doorways at Qasr-e Abu Nasr, but the possibility that they were installed at the site in post-Achaemenid times, first suggested by Flandin and Coste, has been confirmed by subsequent excavations. A number of Achaemenid finds from the site (architectural fragments, stone bowls and plaques, seals, and a sealed tablet inscribed in Elamite) have been construed as objects of curiosity brought to the site, presumably from Persepolis, in Sasanian times.⁸² However, the presence of unmistakable Achaemenid sherds from a trench on the slope of the citadel is not so easily dismissed. These sherds are, in my opinion, good evidence for an Achaemenid occupation on the citadel, the remains of which could easily have been destroyed in the course of Parthian and Sasanian construction.⁸³ In this context it is probably significant that the texts frequently refer to the fortress (*halmarriš*) at Tirazziš.⁸⁴ Furthermore, excavations in the lower town were far less intensive than on the citadel and a fair-sized Achaemenid component could remain undiscovered.⁸⁵

Tirazziš stands apart from other places in Achaemenid central Fars and its location should be sought outside the Persepolis plain. The fact that Tirazziš is not mentioned in texts concerning travel between Persepolis and Susa, and its close connection with Neyriz, strongly imply its location in the region beyond the mountains forming the SW boundary of the Persepolis plain. Aside from Qasr-e Abu Nasr, few Achaemenid sites are known in the region. Several possible Achaemenid sites have been reported near Lake Maharlou, SE of Shiraz; unfortunately the ceramic dating evidence is scant and does not include the more characteristic Achaemenid types.⁸⁶ Further south, at

⁷⁵ For Parsa, see Cameron (supra n. 71) 9, n. 51; for Pasargadae see Stronach (supra n. 3) 280–82.

⁷⁶ Cameron (supra n. 71) 166, n. 7.

⁷⁷ A. Stein, "An Archaeological Tour in the Ancient Persis," *Iraq* 3, Part 2 (1936) 141–42, 204, 205. For additional discussion and illustration of the architectural elements at Fasa see R. Pohanka, "Zu einigen Architekturstücken von Tell-e Zohak bei Fasa, Südiran," *Anzeiger der Österreichischen Akademie der Wissenschaften, Philosophisch-historische Klasse* 120.7 (1983) 255–65.

⁷⁸ P. de Miroschedji, "Prospection archéologiques dans les vallées de Fasa et de Darab," from *Proceedings of the 1st Annual Symposium of Archaeological Research in Iran, Iran Bastan Museum, November 1972* (Tehran 1973) 1–8.

⁷⁹ J. Hansman, "An Achaemenid Stronghold," *Acta Iranica, Second Series III, Monumentum H.S. Nyberg* (1975) 289–309.

⁸⁰ C.C. Lamberg-Karlovsky, *Excavations at Tepe Yahya, Iran*

1967–1969. *Progress Report 1* (Asia Institute Monograph 1, 1970) 22–26; M.E. Prickett, "Settlement and Development of Agriculture in the Rud-e Gushk Drainage, Southeastern Iran," *Akten des VII Internationalen Kongresses für iranische Kunst und Archäologie, München, 7–10 September 1976* (AMIran, Ergänzungsband 6, 1979) 47–56.

⁸¹ For early references to Shiraz see Cameron (supra n. 71) 151, note, line 6.

⁸² C.K. Wilkinson, "The Achaemenian Remains at Qasr-I-Abu Nasr," *JNES* 24 (1965) 341–45.

⁸³ D. Whitcomb, *Before the Roses and Nightingales: Excavations at Qasr-i Abu Nasr, Old Shiraz* (in press) fig. 51.

⁸⁴ Hallock (1969) PF 160, PF 1105.

⁸⁵ For the extent of excavations on the citadel and lower town see Schmidt (supra n. 30) pl. 22.

⁸⁶ W. Kleiss, "Bericht über Erkundungs-Fahrten in Iran im Jahr

Tal-e Hakvan (ca. 60 km. SE of Shiraz), a white stone Achaemenid building foundation (24 × 10 m.) and relief are known. The area of the mound and the extent of the Achaemenid occupation are unknown, but several other Achaemenid sites are reported nearby.⁸⁷ The Hakvan sites are possibly among the group of GNs in the region between Tirazziš and Narezzaš but would appear too remote to be the location of Tirazziš itself. Under the circumstances it is premature to dismiss Qasr-e Abu Nasr as the most probable location of Tirazziš.

The western boundary of the region is defined by a group of sites identified with seals 3 and 30 and located in Kamfiruz by Hallock. The most important place in Kamfiruz is Kaupirriš, which occurs on 32 Fortification tablets, but is not otherwise known in Achaemenid inscriptions. The choice of location for Kaupirriš rests on the resemblance of the GNs Kaupirriš and Kamfiruz and the association of Kaupirriš with the road from Persepolis to Susa.⁸⁸ Ten way stations along the road can be recognized by the frequent issue of travel rations. Nine of the way stations are identified with seal 4, taken by Hallock to define a region extending from Ardekan on the east, near Kamfiruz, to the border of Susiana near Behbahan to the west. The tenth way station, Uzikurraš, is in the Kaupirriš district and is the last known stop before a traveler from Susa reaches Persepolis. The theory that the road follows the route described by Hallock is supported by an abundance of evidence and the location of Kaupirriš in the vicinity of Kamfiruz is well founded.⁸⁹

Matezziš (Old Persian Uvadaicaya) is, after Persepolis, the most frequent destination of travelers from Susa and has the largest work force in the region.⁹⁰ Hallock considered Matezziš to be in the immediate vicinity of Persepolis and suggested that most of the workers receiving rations at Matezziš actually worked at Persepolis. This proposal is particularly cogent in view of the fact that rations are rarely issued

to workers from provisions stored at Persepolis despite the fact that large numbers of workers are known to have been employed there.⁹¹ Not only are the largest work-groups supplied with rations at Matezziš, but one text records the receipt of a large amount of grain from Matezziš by a royal baker at Persepolis. A number of supply officers (*kurmin* persons) operate at both Matezziš and Persepolis, a situation that accords well with proximity in several other cases where proximity is independently determined on evidence of days' travel between places.⁹² Finally, Matezziš is interchanged indiscriminantly with Persepolis as a travel destination in several instances and is strongly connected with other places in the Persepolis region by travel and other texts.⁹³ In summary, the proximity of Matezziš and Persepolis is supported by a variety of textual evidence. Its location elsewhere would require a radical re-interpretation of the geographical data in the Fortification texts and would leave Persepolis isolated and without the logistic support required by a major administrative center and construction site.

However, two other locations for Matezziš have been proposed. Ran Zadok has suggested that Humadešu is the Babylonian transcription of a variant of the Old Persian GN Uvadaicaya and hence Matezziš. Zadok further proposed a location for Matezziš in western Fars, within a 16-day travel radius of Babylon. The dated legal documents on which this argument rests do not actually require travel between Matezziš and Babylon, as assumed by Zadok, and hence the argument is not compelling.⁹⁴

Hansman argues that Matezziš is to be located at Tal-e Zohak in Fasa (140 km. SE of Persepolis). The presence of an Achaemenid component at Zohak is beyond question. Although the extent of the Achaemenid settlement is unknown, it could have been as great as 50 ha., a major site for Achaemenid Fars. While I am unable to suggest counter-arguments to Hansman's historical and etymological reasons for lo-

1972," *AMIran* N.S. 6 (1973) 8–80. My brief surveys in the region of Shiraz and Sarvestan produced no Achaemenid sites and apparently no Achaemenid sites were discovered by Gotch; see P. Gotch, "A Survey of the Persepolis Plain and Shiraz Area," *Iran* 6 (1968) 168–70; Gotch, "The Persepolis Plain and Shiraz: Field Survey 2," *Iran* 7 (1969) 190–92.

⁸⁷ S.M.T. Mostofi, *The Land of Pars*, trans. R.N. Sharp (Chippenham 1978) 56–57, pl. 147.

⁸⁸ Hallock (1977) 129, 131; in a personal communication Matthew Stolper notes the "... resemblance between the names Kaupirriš and Kamfiruz and the plausible assumption that Kaupirriš (with variants Kamparriš, Kampirriyaš, etc.) is an Achaemenid Elamite transcription of an Ancient Iranian name that developed into the modern Persian form, Kamfiruz ..." without endorsing the conclusion that identity is demonstrated.

⁸⁹ Hallock (1977) 129–32; Hallock (1978) 109–114. For excava-

tions at an Achaemenid site along the road, see K. Atarashi and K. Huriuchi, *Fahlian I, The Excavations at Tepe Suruwan*, 1959 (Tokyo 1963).

⁹⁰ Hallock (1971) 17–18.

⁹¹ Hallock (1977) 130.

⁹² For flour supplied from Matezziš, see Hallock (1969) PF 1940; for the number of shared officials see M. Stolper, "The Neo-Babylonian Text from the Persepolis Fortification," *JNES* 43 (1984) 299–310, 306 n. 27. Supply officers along the road are active at several places known to be within one or two days' travel, see Hallock (1977) 129–30 and (1978) 109–11.

⁹³ Hallock (1978) 113.

⁹⁴ R. Zadok, "On the Connections between Iran and Babylonia in the Sixth Century B.C.," *Iran* 14 (1976) 61–78; Stolper (supra n. 92) 307 n. 31.

cating Matezziš at Tal-e Zohak, I find the arguments in favor of a location near Persepolis far more convincing. Further, the original identification of Fasa with the GN Bašiyan, supported by Bailey, is an attractive alternate name for the Achaemenid settlement at Zohak.⁹⁵

THE PERSEPOLIS REGION AND ITS DISTRICTS

The foregoing discussion allows us to invoke a second line of reasoning to delineate the settlement geography around Persepolis in more detail. The most frequent GN in the Persepolis texts is Parsa (with variants); other GNs occur with decreasing frequency as shown in Table 2.⁹⁶ Assuming that frequency of occurrence in the texts is a rough measure of size and importance, the places in Table 2 can be tentatively divided into a settlement hierarchy as indicated. Geographical location theory allows the further predic-

tion that each city will serve as the regional center for several towns and associated smaller settlements. Furthermore, the relative location of city regions and town districts within regions should be indicated by the rate of interaction between various places in the settlement hierarchy. Interaction is conditioned by distance, barriers to travel such as unbridged rivers or steep mountains, by communication networks such as roads, by the differential location of services or commodities, and by administrative boundaries. Empirical studies have shown a significant, but not exact, correspondence between this model and actual settlement systems in many parts of the world, including the Near East.⁹⁷

Following these simple assumptions, the settlement hierarchy (Table 2) can be converted into a diagrammatic regional model centered on Persepolis (Parsa), with three urban regions and a dozen rural districts

Table 2: Central Fars Settlement Hierarchy
(Frequency of Geographic Names [GN] in the Persepolis Fortification [PF] and Treasury Texts [PT])

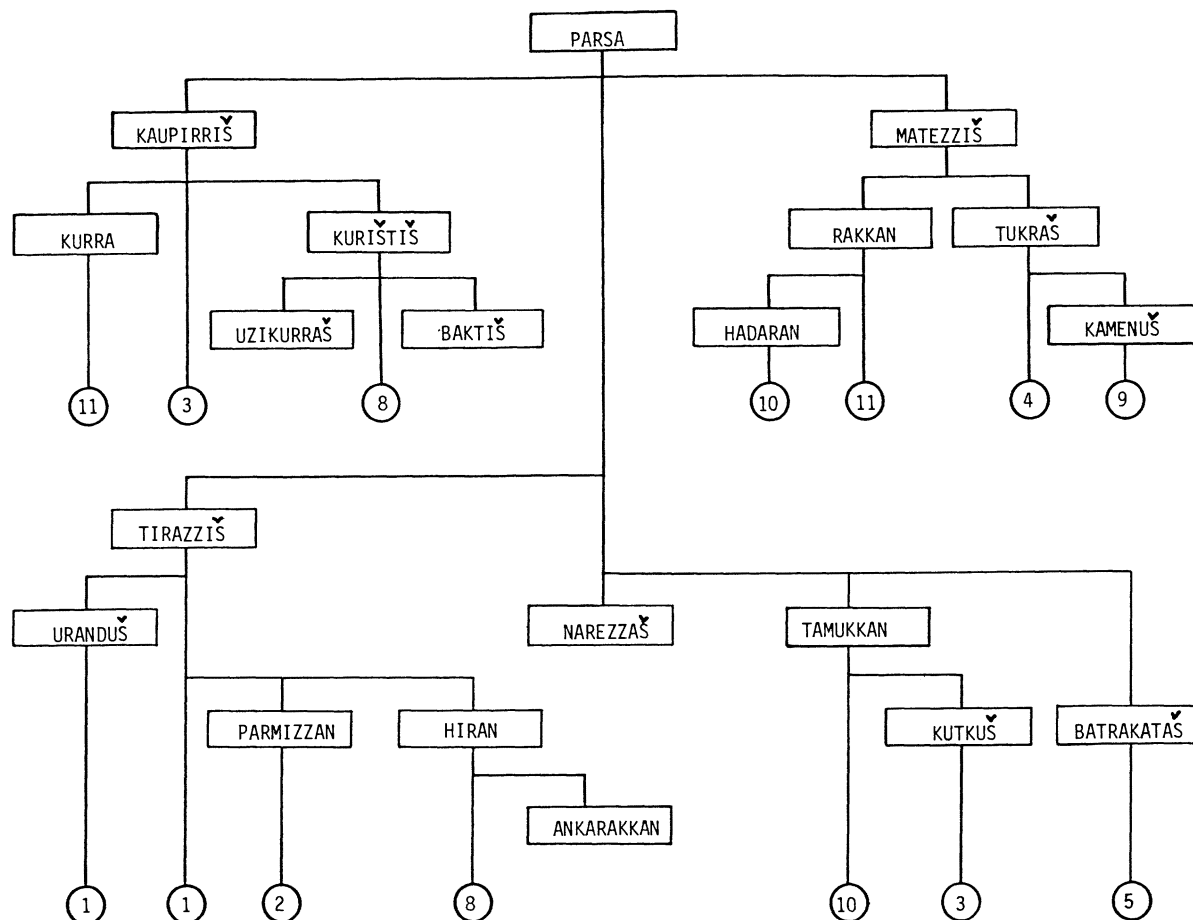
<i>Hierarchy</i>	<i>GN</i>	<i>Frequency</i>	
		<i>PF</i>	<i>PT</i>
Cities	Parsa	(351)	
	Matezziš	36	1
	Tirazziš	35	3
	Kaupirriš	32	
Large Towns	Kurra	23	
	Uzikurraš	23	
	Uranduš	20	
	Baktiš	18	
	Tamukkan	17	
	Tukraš	17	1
Towns	Hiran	15	1
	Narezzaš	13	2
	Rakkan	12	
	Kurištiš	11	
	Ankarakkan	9	3(?)
	Batrakataš	9	
	Pittannan	9	
	Kutkuš	8	
	Parmizzan	8	1
Villages	95 GNs	<7	Each

⁹⁵ Hansman (supra n. 79); Cameron (supra n. 71) 167, note lines 5–6; H.W. Bailey, "Nasa and Fasa," *Acta Iranica, Second Series III, Monumentum H.S. Nyberg* (1975) 309–12.

⁹⁶ Table 2 counts only the number of texts in which the GN occurs, as listed in Hallock (1969) glossary, and does not count multiple occurrences in a single text. The figure for Persepolis is taken

from a count provided by Hallock including both Fortification and Treasury texts.

⁹⁷ For example, see M.E. Bonine, "City and Hinterland in Central Iran," in Gunther Schweizer ed., *Interdisziplinäre Iran-Forschung, Beihefte zum Tübinger Atlas des Vorderen Orients, Reihe B40* (Wiesbaden 1979) 141–53.



Ill. 6. Achaemenid regional structure

composed of larger or smaller towns and associated villages (ill. 6). Villages are associated with each other and with towns, which are associated in turn with one of the cities, on the basis of transfers of produce, mostly grain or wine, or issues of rations to workers at one GN from another GN. By this process all of the larger places in central Fars, except Pittannan, and all but 10 of the villages are placed within a district. The relative location of districts is determined by the strength of ties between districts, represented by transfers of material between towns, or boundary villages with ties to towns in neighboring districts.

Although Hallock did not group towns and villages to form districts the idea is implicit in his interpretation and the principles followed here are logical extensions of his analysis.⁹⁸ The model presented in ill. 6 makes use of only a fraction of the data found in the Fortification texts and would certainly be modified and expanded if the unpublished texts and other cate-

gories of information such as seals and named officials were included in the study. The model no doubt has some places at the wrong level in the settlement hierarchy, or some villages in the wrong district, and the relative geographic location of districts is only approximate. Nevertheless, the coherence of the patterns revealed by the model and its consistency with theoretical expectations encourages the belief that it is a good approximation of Achaemenid settlement in central Fars.

The Matezziš urban region, some of the Kaupirriš region, and several Tamukkan places, fall within the archaeological settlement system presented in the initial part of this paper (ill. 3 and Table 1). Before discussing Matezziš and Kaupirriš, a few comments on the other districts are in order.

The group of places between Tirazziš and Narezzaš are notable for the small number of associated villages and for the strong interconnecting links among

⁹⁸ For analytical principles see Hallock 1971: 18–21; 1977: 129–32; 1978: 109–16 *passim*; see also *supra* n. 74.

the towns. Uranduš is probably near Tirazziš in the Shiraz plain. Parmizzan has several connections with Tukraš in the Persepolis plain and probably lies along the lower right bank of the Kur river (ill. 7). Hiran, then, would be somewhere between Shiraz and Neyriz, possibly in Sarvestan, Runiz, or Estahbanat. Tamukkan and its dependent villages have connections with both Narezzaš and Batrakatuš (Pasargadae) and probably lie between them. The location of Tamukkan within one travel day of Matezziš is implied by travel ration issues at Matezziš for workers traveling from Rakkan to Tamukkan.⁹⁹ Both the Sadatabad district and south Arsenjan (ill. 7) conform to these criteria although the central location of Arsenjan between Pasargadae and Narezzaš makes it the more probable location for Tamukkan.¹⁰⁰

Beyond the districts presented in ill. 6, the Fortification texts provide extensive documentation for places along the road from Persepolis to Susa via Ardekan, Fahlian, and Behbahan.¹⁰¹ There are also a few mentions of places northwest of Pasargadae along the road to Media¹⁰² and a residual group of GNs that show evidence of spatial clustering, but are difficult to place geographically. Achaemenid archaeological sites are known in the districts just reviewed but no district is sufficiently well known to encourage settlement and land use analysis.

The geographic scope of the Fortification texts strongly suggests that Fars was divided into several administrative regions, each composed of smaller districts. The Fortification archive contains the administrative records of northern Fars. However, the administrative records for regions to the south and east, notably Darab, Firuzabad, and possibly Fasa, are missing; they are either in an unexcavated archive at Persepolis, or were maintained at a regional center to the southeast. Furthermore, the existence of an undiscovered higher order administrative archive, dealing with several regions, is strongly implied by this geographic interpretation of the Fortification texts.

In the following discussion locations are proposed for Matezziš, Kaupirriš and the surrounding districts. The districts are briefly described as they appear in the Fortification texts and this description is compared with the archaeological and geographical characteristics of the districts.

If Matezziš is a large urban center supplying workers rations and other materials and services in support

of daily operations and continued construction at Persepolis, then the choice of Persepolis West and Firuzi as the location of Matezziš seems obvious (ill. 4). The texts do not reveal much about activities at Matezziš. There is a treasury, religious ceremonies are performed, and grain and wine are issued on behalf of the king (Darius I) or his wife Irtasduna (Artystone). The largest amounts dispensed are for groups of workers ranging in size from 16 to 702; of the nine recorded issues of workers' rations, the only occupations specified are treasury workers (twice) and "*sit-map*" workers (once). Rations are issued for fowl maintained at Matezziš, but neither rations for other animals nor setting aside of seed grain are recorded. Matezziš is the destination of travelers in 13 texts, mostly from Susa, and is the origin of travelers in three texts. Travel rations are also issued at Matezziš for large parties (980 maximum) traveling from Rakkan to Tamukkan.¹⁰³

All of the small towns and villages in the Matezziš hinterland can be placed within the Rakkan or Tukraš districts and none have exceptionally close ties directly with Matezziš, a pattern consistent with the relative isolation of Firuzi and Persepolis West from other Achaemenid sites.

The cluster of sites around Band-e Amir (ill. 3, Y) is an appropriate location for Tukraš, with its close connections to Parmizzan, 30 km. to the SE on the right bank of the Kur river. Transactions at Tukraš concern rations for workers in groups of 20–50; 88 is the largest group. There are also accounts concerning seed grain, fruit storage, horse rations and issues of grain for religious ceremonies. The most unusual text concerning Tukraš records an inventory of tree seedlings (?) at Tukraš and four other places.¹⁰⁴

Kamenuš, a town in the Tukraš district, is located at Persepolis South (ill. 4), because it is known to be the location of an important accounting office within one travel day of Persepolis. In addition to its accounting function Kamenuš is involved in local grain and wine transfers.¹⁰⁵

Rakkan, the second large town in the hinterland of Matezziš, is tentatively located at site R (ill. 3) in Ramjerd. This choice places Rakkan within one travel day of Matezziš on the assumption that issues of travel rations at Matezziš to workers en route from Rakkan to Tamukkan implies a two-day trip, the first stage being Rakkan to Matezziš.¹⁰⁶ This location also

⁹⁹ Hallock (1978) PFa 30.

¹⁰⁰ Hallock (1978) 109, 115.

¹⁰¹ Hallock (1978) 109–13; also see Atarashi and Huriuchi (supra n. 89).

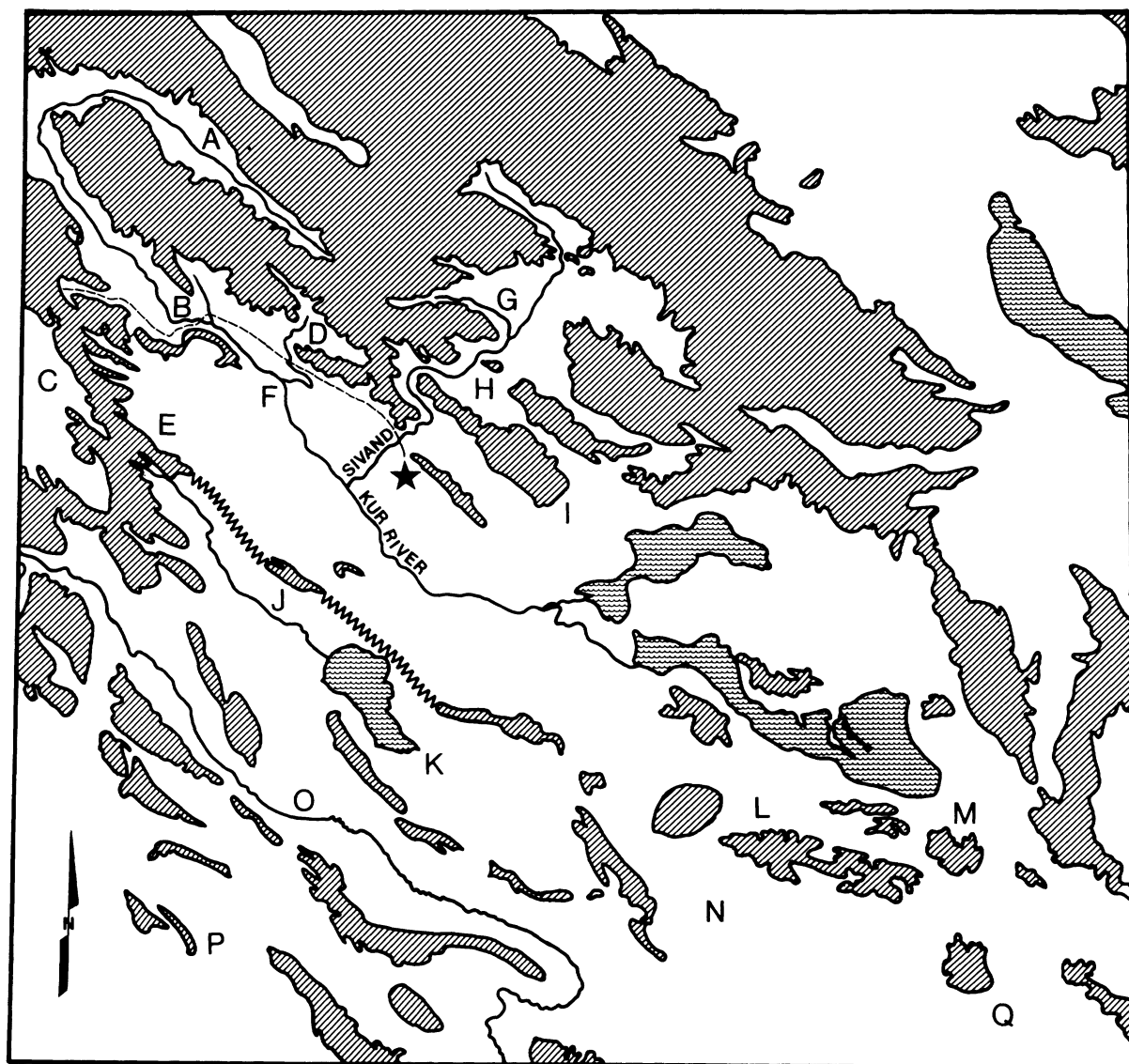
¹⁰² Hallock (1978) 109, 110, 115.

¹⁰³ Hallock (1969) 762, various texts; Hallock (1978) PFa 30.

¹⁰⁴ Hallock (1978) PFa 33.

¹⁰⁵ Hallock (1977) 132.

¹⁰⁶ Supra n. 103.



Ill. 7. Central Fars

Symbol	Modern GN	Achaemenid GN	Symbol	Modern GN	Achaemenid GN
A	Asupas (Ujan)	Kurra?	I	Arsenjan	Tamukkan
B	Kamfiruz	Kurra?	J	Shiraz	Tirazziš
C	Ardekan	Parmadan	K	Sarvestan	
D	Abarj	Kurra?	L	Runiz	
E	Baiza	Hadaran/Anshan	M	Neyriz	Narezzaš
F	Ramjerd	Rakkan	N	Fasa	Bašijan
G	Dasht-e Morghab	Batrakataš (Pasargadae)	O	Hakvan	
H	Sadatabad		P	Firuzabad	

places Rakkan near well documented natural pastures between Ramjerd and Baiza (ill. 7).¹⁰⁷ Rakkan and several villages in the district are notable for animal husbandry. One text records the issue of rations to 93 gentlemen and 180 boys (cowboys?) who feed (?) *bariš* horses kept at Rakkan and another text orders rations issued to 135 men who feed mules and horses, belonging to the king and princes, maintained at Karakušan. Other texts record issues of rations for horses, sheep, or cattle at Karakušan, Hatukurran-sana, or Rakkan.¹⁰⁸

There is also evidence associating Rakkan with irrigation, if the meaning "irrigation worker" assigned to *numakaš* is correct. The texts record rations issued to 81 Lycian (Turmiriyan), 220 Thracian (Skudrian), and 162 Bactrian and Lycian irrigation workers at Rakkan, and smaller groups at Mišdubaš.¹⁰⁹ Although site R is at the periphery of the Soon irrigation system, it is not an unlikely place for rations to be issued to workers engaged in canal repairs and cleaning within a 25 km. radius to the north. Presumably the work groups camped near the canals but were supplied from warehouses at Rakkan rather than from the small farming villages. Thus, the location of Rakkan at site R satisfies all the direct locational implications of the texts.

A treasury is located at Rakkan, religious ceremonies are performed, Babylonian scribes write on parchment, important officials receive rations, and considerable quantities of grain are shipped from nearby villages to Rakkan to fulfill ration requirements of large work groups employed there. Rakkan does not appear to be on any important road; no travel rations are issued there, but the presence of an exceptional number of "horses traveling the road" and other types of horses suggests that the road from Persepolis to Susa is not far from the Rakkan district.¹¹⁰

Hadaran has links with Matezziš, Rakkan, Persepolis, Titazziš, and even Pasargadae, and it is also linked to Anshan via the village Battirakkan. Thus the centerpoint suggested by links to larger places and the connection to Anshan (Tal-e Malyan, ill. 3, K) converge on a location for Hadaran in the Baiza district along the southwest margin of the valley (ill. 7, E).¹¹¹ Texts concerning Hadaran, Anshan, and other villages in the district mention relatively small work

groups. Other texts concern rations for horses, sheep and cattle indicating the importance of animal husbandry in the district, probably exploiting the natural pastures between Baiza and Ramjerd. Although no travel rations are issued at places in the Hadaran district there is a reference to "road counters" (surveyors?) awaiting the King at Hadaran after surveying (?) the Ramitepe road. There is also an enigmatic text concerning wine rations for a man, Šada, and 11 horses, stating that "he went from Anshan (and) from Elam".¹¹² Clearly neither of these statements signify the well traveled road from Persepolis to Susa, which does not cross the Hadaran-Anshan district.

Matezziš, Tukraš, and Rakkan, along with their smaller dependent towns and villages, fit together nicely and account for practically all of the archaeological sites in the valley. A group of five sites around Kuh-e Qale (ill. 3, J, M, P), several sites near Kuh-e Shahrak (ill. 3, C), and an isolated site NE of Persepolis (ill. 3, east of site U) remain unaccounted for.

The match between the Kaupirriš urban region and archaeological sites in Kamfiruz and along the left bank of the Kur River is less satisfactory than the match for Matezziš, Rakkan, and Tukraš. There is very little land on the left bank and very few Achaemenid sites, whereas the Kaupirriš hinterland, as reconstructed from the texts, has just as many towns and villages as Matezziš. The disparity between the number of sites (10 actual, 33 expected) and the number of GNs (27) is insignificant but the location of archaeological sites does not compare well with the district structure of Kaupirriš. The first reference point is Uzikurraš, in the Kurištiš district, which is the first known regular stop on the Persepolis to Susa road. Assuming no stop closer to Persepolis is missing from the Fortification texts, and assuming an average of 5–6 *farsakhs* (i.e., 30–35 km.), between caravan stops, Uzikurraš should be near site F (ill. 3), if the road crosses northeast of Kuh-e Qale and Kuh-e Istakhr.¹¹³ If the road goes around Kuh-e Qale, via site M, then Uzikurraš would be near site J. In either case Uzikurraš is not just a small way station such as site F, but a village engaged in the usual agricultural activities as well as providing rations for travelers.

A group of travelers en route from Kerman to Susa, presumably via Persepolis-Matezziš, received rations

¹⁰⁷ G. Le Strange (trans.), *Description of the Province of Fars at the Beginning of the Fourteenth Century A.D.*, from the ms. of Ibn Al-Balkhi (Asiatic Society Monographs 14, 1912) 28; Hasan-e Fasa'i, *Farsnama-Ye Naseri* 2 (Tehran 1345 AH) 183, Abbas Ali-zadeh kindly translated the section on Baiza.

¹⁰⁸ Hallock (1968) PF 1793, PF 1946, PF 1947.

¹⁰⁹ Hallock (1968) 53, PF 1946, PF 1947.

¹¹⁰ Hallock (1968) 747, various texts.

¹¹¹ Hallock (1978) 114.

¹¹² Hallock (1969) PF 1780; Hallock (1978) 112, 114, PFa 30; see also Hansman (supra n. 36) 119.

¹¹³ The *farsakh* is nominally the distance covered on foot in one hour, on average about six km. The Islamic caravan routes radiating from Shiraz, conveniently summarized in Whitcomb (supra n. 39) 135–36, average 5.7 *farsakhs* per stage. See W. Hinz, "Farsakh," *Encyclopedia of Islam*, new ed. 2 (Leiden 1966) 812–13.

at Mištukraš, a village linked directly with Kaupirriš, and at Kurra, a town in the Kaupirriš hinterland. Hallock suggests that these travelers were heavily burdened and traveling slowly, accounting for the issue of rations at places not usually used as travel stops.¹¹⁴ The obvious corollary of this reasoning is that Mištukraš, Uzikurraš, and Kurra are probably no more than a normal half day's travel apart (ca. 15 km.). Kurra and Kaupirriš both occur in texts with seal 4, the seal identified with Ardekan and Fahlian west of the valley on the road to Susa, although they occur more often in texts with seals 3 or 30, the Kamfiruz seals. Thus Kurra and Kaupirriš should be in the Abarj, Dashtak and Kamfiruz districts (ill. 7), and Kurištiš, along with the regular travel stop Uzikurraš, should be in the vicinity of Kuh-e Qale (ill. 3, J or M). Nothing in the texts provides additional support or casts doubt on the proposed location of these districts. The Kurra district probably includes villages further upstream, beyond the limits of the archaeological survey, and perhaps even villages in the high valley around Asupas (ill. 7), where three Achaemenid sites are known.¹¹⁵

Despite the considerable number of villages, both Kaupirriš and Kurra emerge from the texts as centers of small, isolated rural districts. Grain rations are issued to workers, or provided as animal feed, but never in large quantities. Work groups never exceed 80 workers and occupations are not listed except for 28 stockyard workers at Kaupirriš. Several texts report shipments of small quantities of grain to Persepolis but otherwise very few links to towns or villages in other districts are recorded. The isolation of Kurra and Kaupirriš from Rakkan, just across the Kur river, is not surprising since the river is deeply incised and constitutes a considerable barrier to travel. Although Kaupirriš is mentioned frequently in the texts, its status as a city is otherwise only indicated by the presence of a treasury and religious functionaries.

The Kurištiš district is notable as the location of Uzikurraš, an important travel stop on the road to Susa, and Baktiš, a large town closely linked to Kurištiš, but isolated from local villages and other towns. Kurištiš functions as a local center issuing rations to workers at Baktiš and several villages. None of the work groups mentioned are designated irrigation workers, as might be expected if the district is watered by the Band-e Dukhtar canal.

One text connected with Kurištiš may, however, provide a clue to the function of the Band-e Dukhtar canal and reservoir. This text is a letter from Ukama and his companions to Parnaka, the chief administrative official in the Persepolis region, and refers to four places designated as *irmatam*.¹¹⁶ The word *irmatam*, translated as "estate" by Hallock, is often spelled with a determinative normally used with personal names and titles, and less frequently with the determinative normally used with GNs or words for places. In the text under discussion *irmatam* is spelled with the horizontal determinative used with places. In the Fortification texts *irmatam* usually occurs in a context that can be rendered by the formula "at the estate of personal name, in or at GN"; a geographical district name, rare in other contexts is sometimes added: "in the district GN". The personal names associated with *irmatam* often identify functionaries of moderate rank in the administrative hierarchy. Some individuals are associated with estates in several places, less often more than one GN is within a single estate.¹¹⁷ It seems clear that estates have a geographical referent in the sense that the duties and rights of individuals with designated estates are localized in or near villages. However, it is by no means clear that *irmatam* refers to a farmstead or country manor, a distinct localized geographical entity, as distinguished from an administrative entity conceptually localized, but physically indistinguishable from the village and landholding matrix in which it exists. From an archaeological viewpoint the distinction is obviously important.

The word *irmatam* occurs in 30 Fortification texts (nine unpublished) and is associated with 19 named individuals. Fifteen estates are at or near places in central Fars. Only two districts have as many as four estates: Tukraš, and Kurištiš, the district presently under discussion. All four of the estates near Kurištiš are referred to in the letter from Ukama to Parnaka. Ukama appears in several other texts as a minor functionary, although his exact status is not clear. Ukama reports an inventory of "... grain which is set aside in our *tidda* ..." In this text the word *tidda* designates a special place to store grain, perhaps in a fortress since other individuals designated "*tidda* chiefs" are called "fortress guards" in another text.¹¹⁸ The inventory reported by Ukama consists of small quantities of grain, 3.5 to 20 *bar*, provided from special stores at

¹¹⁴ Hallock (1978) 111.

¹¹⁵ WMS.

¹¹⁶ Hallock (1969) PF 1857.

¹¹⁷ The discussion of *irmatam* is based on a personal communica-

tion from Matthew Stolper; for the role of Parnaka and his subordinates, see Hallock (1971) 12-17.

¹¹⁸ Hallock (1969) 761.

seven named places in the Kurištiš district, including Kurištiš. Four of the places are specified as "the *irmatam* of [personal name]." It appears that the grain reported in Ukama's inventory was actually brought from the specified places to the *tidda* and held there as provisions. The small quantities of grain involved indicate that the *tidda* provisioned a small number of individuals. Furthermore, the unusual source of these provisions, and the fact that the inventory is reported in a letter to Parnaka rather than a normal accounting text, sets these provisions apart from provisions issued at villages or issues of rations to work groups. It is tempting to speculate that the provisions reported by Ukama were intended for guards stationed at small forts or police posts such as sites F and P, both of which are in the Kurištiš district.

In any event, the presence of four estates in the Kurištiš district suggests a plausible explanation for the Band-e Dukhtar canal and reservoir as well as for the unusual lack of sites in the triangle between the Sivand and Kur rivers below the reservoir. Assume, with the previously noted reservations in mind, that the four estates are geographically distinct rural establishments, assigned to middle-level local officials as perquisites of office but entailing the obligation to provision small local garrisons or provide provisions for religious functions and itinerant officials. Such estates can be visualized as comfortable country residences, operated by a few retainers who maintain the buildings, tend the surrounding gardens, and engage in small-scale farming on their own account or as tenants of the official holder of the estate. The association of gardens with estates is perhaps reinforced by the inventory of tree seedlings (?) at Tukraš, the other district with four estates. No doubt estates would serve as rural retreats from the burden of administrative duties, and holding estates would signify the prestige of the holder. Some individuals hold several estates, for example Šutezza, an official active in supplying and apportioning rations at Kutkuš and Tamukkan, who has three estates in the Kutkuš district. Ištīmanka, an official of similar rank, holds an estate at Kurra and another in the Kaupirriš district.

The description offered of these estates is perhaps fanciful, but it is nevertheless entirely consistent with the evidence concerning estates in the Fortification texts. Further, the description accords well with our understanding of Achaemenid culture, particularly among the elite. Xenophon tells us of Lysander's visit to the garden laid out by Cyrus the younger at Sardis,

and the pride with which Cyrus accepted Lysander's compliments on the garden. The garden beside the palace at Susa apparently served as a retreat for the king in moments of stress.¹¹⁹

At Pasargadae, the best known Achaemenid garden, there are stone-lined water channels, small pools, and square pavilions around the palaces and Cyrus' tomb. There are several references to royal estates (*ulhi*) or palaces (*u-el-mannu*) in the Fortification texts and it is reasonable to suppose that sites such as the building at Dasht-e Gohar (ill. 3, T) or the gate building at Firuzi 6 (ill. 4) are royal or elite residences situated in gardens.¹²⁰ So too, the other stone building sites at Band-e Amir and elsewhere in the valley, remote from Persepolis and Matezziš (ill. 3, C, E, M, V), may be similar dwellings, set in gardens at agricultural estates held by local officials, emulating the royal custom.

If such is the case, the Band-e Dukhtar canal does not require the presence of village sites in the district receiving water from the reservoir. The canal would have been constructed at royal command, perhaps instigated by local officials, without regard for the small amount of land to be irrigated relative to the length and expense of the canal or the inefficiency of the reservoir. The beneficiaries would be the royal and official estates located on the right bank of the Sivand River opposite Matezziš and west of Naqsh-e Rostam. Perhaps aqueducts also carried water across the Sivand to Matezziš itself.

It is apparent that these estates would become very inconspicuous archaeological sites. The buildings would have been of durable construction and well maintained during their occupancy. Furthermore, the duration of occupation, dependent upon imperial maintenance of the Band-e Dukhtar irrigation system, would have been relatively brief in archaeological terms. Both the density of buildings and the intensity of occupation would have been relatively low. Once the buildings were abandoned the stone column bases and foundation slabs would be quickly buried beneath a thin mantle of decayed mud brick and over a few generations the standing stone elements such as door jambs would be carried away for use elsewhere, or would fall over and blend into the landscape. Such sites are very different from the usual accumulation of trash and mud brick debris characteristic of ordinary Near Eastern village sites created by repeated construction of buildings on the collapsed remains of earlier structures over many generations, often millen-

¹¹⁹ Xen. *Oec.* 4.20–25 (trans. E.C. Marchant, Loeb Classical Library, 1923); *The Book of Esther* 1:5, 7:7.

¹²⁰ Stronach (supra n. 3) 107–12 for the gardens at Pasargadae and 135 for early gardens in the Persepolis plain.

nia. Archaeological surveys in the valley have not been intensive walking surveys and a number of estate sites could exist undetected. The cogency of this observation is reinforced by the fact that the Dasht-e Gohar palace and several of the Firuzi building sites were recently discovered as a consequence of mechanized plowing introduced after the new Dorudzan dam and irrigation system were put in operation. This reconstruction is conjectural in many details, but it offers a useful point of departure for future research on Achaemenid settlement in the Persepolis plain.

The final feature for which we have both archaeological and textual evidence is the Achaemenid road from Persepolis to Susa. The textual evidence indicates that Uzikurraš, the first stop on the road, is on the left bank of the Kur River in the Kurištiš district. The next known stop on the road is Parmadan, located by Hallock in the Ardekan plain (ill. 7) some 80 km. from the proposed location of Uzikurraš, if the road follows the route indicated on ill. 7.¹²¹ This is a long stage of approximately 13 *farsakhs*, but alternate routes crossing the Kur River further downstream and proceeding across Ramjerd and Baiza would be only one, or at best, two *farsakhs* shorter, still an exceptionally long stage.¹²² Very few places along the road are specifically identified by GN in the travel ration texts and it is possible that one or more stops remain to be identified. On present evidence the proposed route fits the textual and archaeological evidence better than alternate proposals that suggest a route through Baiza or even through Shiraz and Kazerun.¹²³

QUESTIONS AND PERSPECTIVES:

"*yeki bud, yeki nabud*"¹²⁴

It is premature to speak of conclusions concerning Achaemenid settlement and land use in the Persepolis Plain. The archaeological and textual evidence, taken together, provide a vivid picture of the region but at the same time raise fundamental questions about the geography, history, and perhaps most significantly, the social and economic dimensions of Achaemenid culture. The description invokes familiar concepts such as city, town, and village, but the exact connotation of these terms in the Achaemenid context remains a challenging question.

Matezziš was already an important town during Cambyses' reign, with a cosmopolitan population including Babylonians recording legal contracts in their own language and traveling back and forth to the cities of Mesopotamia.¹²⁵ Further, it is reasonable to suppose that the rebel Vahyazdata was at Matezziš when Darius' general, Artavarnya, arrived at Rakkan in the spring of 521 B.C. to quell the revolt. The first battle was no doubt fought near Rakkan or Matezziš in the plain below the future site of Persepolis. Later, after the second battle, fought somewhere to the southeast beyond Neyriz, Vahyazdata was brought back to Matezziš for execution.¹²⁶

At that time the town of Matezziš (Persepolis West) was inhabited and the elite dwellings at Firuzi and Dasht-e Gohar were already standing. When Darius ordered the construction of Persepolis, Matezziš suddenly became a boom town, host to hundreds of foreign workers, brought in with their families for the great project. By the time of the Persepolis Fortification texts, spanning the 13th to 28th year of Darius (509–494 B.C.), the peaceful quiet of the Firuzi gardens was shattered by the crack of masons' hammers and the roar of kilns firing ornamental glazed bricks. One might go on to describe the growth of Matezziš into a great city along classic Mesopotamian lines, but the texts and the archaeological evidence do not support such a reconstruction. Persepolis-Matezziš was not a great city on a par with Babylon, or even Susa. Given time it might have grown into a city comparable to its local predecessor, Elamite Anshan, but Alexander foreclosed that possibility and Sasanian Istakhr became the next great city of Fars. Matezziš remained a simple provincial town, temporarily galvanized by the construction of Persepolis, itself never more than the spiritual center of the empire. By the same reasoning Tirazziš and Kaupirriš are only cities because of their standing in the local settlement hierarchy. They are only marginally differentiated, if at all, from towns such as Rakkan, Tukraš, and Kurištiš. From the geographical perspective, the questions posed concern first, confirmation that the hierarchy seemingly established with such clarity by both archaeological and textual data actually exists, and second, exactly what economic, political, and social char-

¹²¹ Hallock (1977) fig. 1; Hallock (1978) 110.

¹²² See supra n. 113.

¹²³ For recent discussion of alternate routes, with references, see Pierre Briant, *Rois, tributs et paysans* (Centre de Recherches d'Histoire Ancienne 43, Paris 1982) 161–73; Hansman (supra n. 36) 117–22; Kleiss (supra n. 41) fig. 1; M.T. Mostafavi, "The Achaemenid Royal Road: Post Stations Between Susa and Persepolis," in *Proceedings of the 4th International Congress of Iranian Art and Archaeology* (A Survey of Persian Art 14) 3008–3010.

¹²⁴ "Once upon a time," literally: "Once there was, once there wasn't," is used here in recognition of the speculative nature of this paper, but also to emphasize the importance of attempts to push beyond the bare bones of archaeological and textual data to a deeper understanding of ancient life, even if our first efforts are later shown to be fairy tales.

¹²⁵ Zadok (supra n. 94).

¹²⁶ R.G. Kent, *Old Persian: Grammar, Texts, Lexicon* (American Oriental Series 33, 1953) DB III. #40–44.

acteristics differentiate various levels in the hierarchy. Further study of the texts may shed some light on these questions, but well designed archaeological fieldwork, both surface survey and excavation, is more likely to provide answers.

From the historical, or perhaps political, perspective, the location of Matezziš adjacent to Kuh-e Rahmat raises questions about the site chosen for Persepolis. The fact that Vahyazdata was executed at Matezziš, and the possibility that he suffered his first defeat in the vicinity, suggests a heroic parallel with the legend that Cyrus established Pasargadae at the scene of his triumph over Astyages.¹²⁷ Without putting a literal interpretation on the legend we can reasonably inquire into the political considerations that played a role in Darius' choice of the Persepolis site. Matezziš was an important town in the largest agricultural region of Fars. It was not associated with Cyrus and the senior dynastic line in the way that Pasargadae and Anshan were; these facts may well have influenced Darius.

The great agricultural potential of the Persepolis plain leads us to another significant question raised by the archaeological and textual evidence. Comparisons between chronological phases at different cultural and technological stages, and of different durations, is a complex archaeological and historical problem. It is nevertheless apparent that the Achaemenid settlement pattern of only 39 known sites is very different from the Kaftari phase (ca. 2200–1600 B.C.) with 74 known sites, or even the much earlier Bakun phase (ca. 4800–3900 B.C.) with 156 known sites. In some ways the Achaemenid pattern most closely resembles the Proto-Elamite (Banesh Phase, ca. 3400–2800 B.C.) pattern with 42 known sites, which I have argued elsewhere represents only the sedentary element of a much larger pastoral nomadic population. In both the Kaftari phase, when Elamite Anshan was prosperous and powerful, and the Bakun phase, the culmination of pre-state cultural evolution, settlements were widely dispersed in the valley, with no indication of clustering.¹²⁸ This pattern also stands in notable contrast to the relatively clustered distribution of Achaemenid sites.

Questions raised here concern: 1) the size of the sedentary Achaemenid population, 2) land use pat-

terns, and 3) the organization of agricultural and pastoral production.

The estimated total sedentary population of the valley, 44,000 (Table 1), is unlikely to be an underestimate. Both the estimated site discovery ratio (30%) and the settlement area to population estimator (100 people per hectare) tend to err in the direction of overestimation. The discovery ratio may well be as high as 50% and, in the absence of a quantified study, the morphology of recently settled pastoral villages suggests a relatively low settlement density, on the order of 50 people per settlement hectare. Population estimates from the texts are also difficult for a number of reasons, notably: 1) because of sampling bias in the recovery of texts, 2) because of the problem of identifying specific work groups to avoid double counting, and 3) because we do not know the proportion of the population appearing in the ration texts. The first problem is in a sense intractable; we will never know the nature of the sample simply because we have no independent knowledge of the universe sampled. With the addition of the 2000 texts already transcribed and the larger fragments (journals, accounts), not yet studied, our confidence in the sample should be improved. The second problem should yield to close analysis of the composition, administration, date and location of work groups, a type of analysis already initiated by Hallock.¹²⁹

The third problem is of considerable interest and some preliminary comments are warranted. The groups of workers on rations, mainly in texts of categories L 1–3 in Hallock's classification, but also in other texts in which ration recipients are identified as "workers" (*kurtaš*), are relevant to this discussion. Persians are explicitly identified as *kurtaš* only in one text.¹³⁰ Otherwise, geographic designations, generally interpreted as ethnic names, are found in 18% of the L texts; 12% of the work groups are identified by occupation or some other modifier. The remaining 70% of the texts refer to work groups otherwise identified only by the names of officials responsible for them (*damana*, *šaramana*), GN, and date; in many cases only part of this information is recorded.¹³¹ The latter work groups, as well as some of the workers identified by occupation, are likely to be drawn from the indigenous population. The occasional references to

¹²⁷ Strab. 15.3.8 (H.L. Jones, trans., Loeb Classical Library, 1930). I am indebted to Jack Balcer for pointing out the parallel.

¹²⁸ Data on the Kaftari and Bakun phases from unpublished work in progress, see (supra n.9); data on the Banesh phases from Sumner (supra n. 59).

¹²⁹ Hallock (1969) 5.28–37.

¹³⁰ Hallock (1969) 29–30, 717. For extensive discussion of *kurtaš* see M.A. Dandamaev and V.G. Lukonin, *The Culture and Eco-*

nomic System of Ancient Iran (Moscow 1980, unpublished trans. from Russian by Dana Dadson, courtesy of Jack Balcer); M.A. Dandamaev, "Royal Estate Workers in Iran," *VDI* 3 (1973) English summary, 25–26; M.A. Dandamaev, *Slavery in Babylon*, rev. ed., trans. V.A. Powell, edd. M.A. Powell and D.B. Weisberg (Northern Illinois University Press 1984) 568–84.

¹³¹ For the role of *damana* and *šaramana* officials see Hallock (1971) 14–17.

conscripted (*rabbaka*) workers reinforces the notion that local people may be temporarily assigned to work groups on rations. Also, the issue of provisions (*hadduš*) at specified places, often in the name of the King or other members of the royal family, suggests that the population does not always subsist on rations. Finally, as shown by Dandamaev, there are approximately the same number of males and females on rations.¹³² This pattern implies, not so much that the work groups are explicitly composed of families, but rather that males and females have equal obligation to participate and that the immigrant population, recruited by whatever means, is composed of families. Note that children below a certain age are unlikely to be counted. It would be necessary to assume that nearly half of the adults (men and women) are unmarried (i.e., elderly survivors or unmarried young adults) in order to reconstruct an average five-person household from Dandamaev's tabulation of workers. It is more reasonable to suppose that infants and small children are not counted in the ration texts.

To summarize, the ration system supports both the local population and an immigrant population of men, women and working-age pre-adults. The work groups are mobilized for both skilled and unskilled labor on routine communal tasks such as canal cleaning, harvesting, perhaps road maintenance, and major projects such as the construction of Persepolis and irrigation works at Bard Burideh II and Band-e Dukhtar.¹³³ Clearly the mobilization of labor for such purposes is a very important aspect of the economy, but it is also apparent that a great deal of the labor devoted to agricultural production is not achieved by workers on rations, but rather by independent farmers, subject to taxes, conscription, and probably other duties to the state.

It is unlikely that the legal status of all workers, including those on rations, is uniform. Certainly slavery exists and is explicitly recognized in at least one text, but models invoking massive use of slaves, feudalism, or exclusive royal control over all production are not justified by the Fortification archive as presently understood.¹³⁴ The exact nature of Achaemenid land tenure and agricultural administration in Fars remains to be elucidated.

Major problems to be addressed are the extent and nature of royal or elite estates and the character of economic activities not represented in the texts. These problems must be approached archaeologically and by

a structural analysis of transactions reported in the texts, emphasizing the logic of interaction among the reported transactions rather than simply classifying and summarizing them.

This discussion so far implies that the settlement system revealed by the archaeological analysis coincides with the settlement system derived from the texts, that is, all the villages and the entire sedentary population of the valley fall within the administrative purview of Parnaka and his subordinates even though a significant range of productive activity is not directly administered. If this is true, we must ask why population density is so low. The most parsimonious answer, suggested by the pastoral focus of early Achaemenid culture, is that extensive pastoral land use is an important element in the local economy. Extensive land use is associated with low population density by definition, but not usually with a clustered settlement system. This problem is overcome if we consider the relatively dense clusters of sites to represent an economic emphasis on agriculture (grain production) while pastoralism is the focus of more dispersed sites, including a greater proportion of undiscovered sites predicted for low-density regions. In this interpretation the districts of Rakkan and Tukraš would be agricultural, Hadran, and perhaps Kurra and Kaupirriš would be pastoral. Pastoral nomadism is not a necessary element in this explanation but could have been present.¹³⁵

Indeed, the texts provide evidence of local pastoralism concentrated in natural pastures between Rakkan, Hadaran and Anshan, and in the districts of Kaupirriš and Kurra, which also have marshy natural pastures (ill. 7). An official named Harrena is called the "cattle chief" (*kasabattiš*) in several letters from Parnaka. In this capacity he is in charge of the royal herds, receiving animals as tax, issuing animals for various purposes, and supervising subordinate cattle chiefs and herders. The fact that live animals are collected as tax and animals are slaughtered to provide hides (parchment) for treasuries shows that a major proportion of pastoral production, that is, the tax base, is not within the system managed by Harrena. The textual evidence at hand implies village-based pastoralism; it is entirely possible that pastoral nomadism existed but is not reflected in the Fortification archive. Thus the observed low population density and the clustering of known sites are comprehensible in terms of a mixed economy in which some set-

¹³² Dandamaev (supra n. 130, *VDI*) 25.

¹³³ For discussion of Achaemenid administration of irrigation and agricultural production see Briant (supra n. 123) 405–89.

¹³⁴ See Stolper (supra n. 92) for a Neo-Babylonian text from the

Fortification archive recording a slave sale.

¹³⁵ For Achaemenid pastoral production in Fars see P. Briant, *Etat et pasteurs au Moyen-Orient ancien* (London 1982) 57–93.

tlements emphasize pastoralism and others emphasize field crops. This explanation is consistent with both textual and archaeological evidence.

This paper can be viewed as a preliminary attempt to combine archaeological and textual evidence to investigate Achaemenid geography and history in Parsa. The results are tentative and suggestive rather

than conclusive, but I believe they demonstrate the value of using both lines of evidence.

DEPARTMENT OF ANTHROPOLOGY
LORD HALL
OHIO STATE UNIVERSITY
COLUMBUS, OHIO 43210